DOCUMENT RESUME

ED 054 188 TE 499 817

AUTHOR	Ellison, Robert L.; And Others
TITLE	The Identification and Selection of Creative Artistic Talent by Means of Biographical Information. Final Report.
INSTITUTION	Institute for Behavioral Research in Creativity, Salt Lake City, Utah.; Utah Univ., Salt Lake City.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Bureau of Research.
BUREAU NO	BR-9-0215
PUB DATE	Jan 71
GRANT	OEG-8-9-540215-4004 (010)
NOTE	144p.
EDRS PRICE	EDRS Price MF-$0.65 HC-$6.58
DESCRIPTORS	*Art Expression, *Biographical Inventories, *Creative Ability, *Predictive Validity, Research Design, Statistical Analysis, *Talent Identification

ABSTRACT

This study was concerned with an investigation of artistic talent measures, the identification of artistic talent, and an examination of the relationship of organizational characteristics to artistic performance. The predictor instrument used was a specially constructed questionnaire made up of multiple choice biographical items and selected climate items. The sample included 501 tenth through twelfth grade students in the arts and 479 tenth through twelfth grade students who were classified as non-art. An item analysis was conducted on the art sample, in a double cross-validation design, to develop scoring keys for the Biographical Inventory (BI) and climate items to predict performance in the arts. The cross validities obtained demonstrated that the BI could successfully predict performance in the arts, both across and within art areas. Scoring keys constructed on the exploratory climate data for the art sample were shown to be related to artistic performance, although the cross validities were lower than those for the BI data. A total sample item analysis conducted on the BI items provided the keys for scoring the art sample and two non-art samples. The results showed that the art sample was significantly different in reference to biographical characteristics. (Author/DB)

ED054188

BR 9-0215

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

FINAL REPORT

Project No. 9-0215

Grant No. OEG-8-9-540215-4004 (010)

THE IDENTIFICATION AND SELECTION OF CREATIVE ARTISTIC TALENT BY MEANS OF BIOGRAPHICAL INFORMATION

Robert L. Ellison
Lawrence R. James
David G. Fox
Institute for Behavioral Research in Creativity
Salt Lake City, Utah 84105

and

Calvin W. Taylor
University of Utah

January 1971

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Bureau of Research

TE 499 S17

Acknowledgments

The authors gratefully acknowledge the time and effort provided by the school administrators, faculties and students at Highland High School and Olympus High School, Salt Lake City, Utah; the Governor's School, Winston-Salem, North Carolina; and the Interlochen Arts Academy, Interlochen, Michigan. Sincere thanks are given to Dr. Leroy Robertson for his insights and assistance in developing the materials employed in this study. The assistance of Virginia Tanner and Dr. Keith Engar of the University of Utah and John Dudd, Byron Hanson and Waldie Anderson of the Interlochen Arts Academy in the development of materials is also greatly appreciated.

The data were collected through the very helpful efforts of Robert Lacklen and Steven Murray. Throughout the study, Lois Dearden, Leslie James and Karen Ellison assisted in numerous ways which is greatly appreciated.

TABLE OF CONTENTS

	Page
LIST OF TABLES	iii
Chapters	
I. INTRODUCTION	1
II. REVIEW OF THE LITERATURE	4
Measurement of Artistic Performance	4
Criterion Research in the Visual Arts	8
Criteria for Music	12
Criteria for Dance	14
Criteria for Theater	15
Studies of Biographical and Climate Data to Predict Scientific and Academic Performance	16
The NASA Studies	16
The Ethyl Study	17
The North American Rockwell Study	18
The Dow Chemical Study	18
The ALPHA Study	19
Related Biographical Data Studies	19
The Assessment of Climate Characteristics - Facilitators or Inhibitors	20
Studies Concerned with the Prediction of Artistic Performance	20
Interlochen Pilot Study	23
III. PROCEDURE	25
Description of the Samples	25
Development of the Biographical Inventory and Climate Items	27
Development of the Criterion Measures of Performance	28
Administration of the Research Instruments	33
Data Analysis	33

TABLE OF CONTENTS
(continued)

		Page
IV.	RESULTS	41
	Criterion and Control Score Analysis for the Art Sample	41
	Item Analysis Results for the BI Items on the Art Sample	59
	Item Analysis Results for the Climate Items on the Art Sample	68
	Predictive Effectiveness of the Academic Achievement Tests	73
	Correlations Between the Academic Achievement Tests, the BI Keys, and the Climate Keys for the Art Sample	77
	Second Item Analysis -- Art Versus Non-Art.	80
	Comparisons Between the Art Sample, Non-Art SF and Non-Art LF Samples on BI Keys. . . .	81
V.	EXAMPLES OF BIOGRAPHICAL AND CLIMATE CORRELATES OF ARTISTIC ABILITY	89
	BI Items for Predicting Performance in the Arts	89
	Climate Items Related to Performance in the Arts.	90
	BI Items for Predicting Art Versus Non-Art	91
	Climate Items Related to Art Versus Non-Art. . . .	92
VI.	DISCUSSION	93
VII.	SUMMARY	102
VIII.	REFERENCES.	105
	APPENDICES	
	Appendix A . . Criterion Rating Form	

LIST OF TABLES

Table		Page
1.	General Characteristics of Each Type and Locus of Creativity	13
2.	Breakdown of Return Rates for the Artistic Student Sample Across Schools	27
3.	Multiple Criteria and Their Sources for Students in the Arts	31
4.	Description of Samples and Statistical Treatment of Biographical and Climate Data	35
5.	Comparisons of Means of the BI Participants with the BI Non-participants for Criterion and Control Variables	40
6.	Means, Standard Deviations and Sample Sizes of Criterion and Control Scores for the Art Sample	42
7.	Correlations of Criterion and Control Scores for the Art Sample	46
8.	Sample Sizes for Correlations Between Criterion and Control Scores for the Art Sample	49
9.	Criterion and Control Scores for Item Analysis of the Art Sample	60
10.	Means and Standard Deviations for BI Keys on Item Analysis of the Art Sample	62
11.	Cross Validities and Correlations Between BI Keys and Criterion and Control Scores for the Art Sample	63
12.	Means and Standard Deviations for Climate Keys on Item Analysis of the Art Sample	69
13.	Cross Validities and Correlations Between Climate Keys and Criterion and Control Scores for the Art Sample	71

LIST OF TABLES
(continued)

Table		Page
14.	Means, Standard Deviations and Sample Sizes of Academic Achievement Tests for the Art Sample	74
15.	Cross Validities and Correlations Between Academic Achievement Tests and Criterion and Control Scores for the Art Sample	75
16.	Correlations Between Academic Achievement Tests, BI Keys and Climate Keys for the Art Sample	78
17.	Sample Size for Correlations of Academic Achievement Tests, BI Keys and Climate Keys for the Art Sample	79
18.	Descriptive Data for the Art, Non-Art SF and Non-Art LF Samples	82
19.	Comparison of Means Between the Art Sample and the Non-Art SF Sample on Total Sample Keys Based on BI Items 1 Through 199	84
20.	Comparison of Means Between the Art Sample and the Non-Art LF Sample on Total Sample Keys Based on Items 1 Through 199	85
21.	Comparison of Means Between the Non-Art SF Sample and the Non-Art LF Sample on Total Sample Keys Based on Items 1 Through 199	86
22.	Comparison of Means Between the Art Sample and the Non-Art LF Sample on Total Sample Keys Based on Items 252 Through 300	88

CHAPTER I - INTRODUCTION

The need for and the importance of continued and expanded research in the general area of creativity and high level talents in our society has been, and still is, most crucial. The creative and other talented individuals in our nation provide assets which should neither be neglected nor only partially developed, but should be as fully utilized as our insights and technological capabilities will permit. The identification and development of the human potentials in our younger generation throughout our educational system, plus the recognition, cultivation, and institutional encouragement of high level talents in the arts, the humanities, and the sciences throughout our society are areas of concern which are in continual need of further innovation and development. Since the late forties and the early fifties, research on the identification and utilization of creative and other high level talents has continued to accumulate. This research has been primarily concerned with creativity in the physical sciences. In a series of studies dating back to 1959, as reviewed in the Survey of the Literature chapter of this report, the present investigators as well as others have demonstrated that biographical data have a consistent record of moderate to very high validity coefficients in predicting a variety of criteria of scientific performance, particularly creativity. In these studies, biographical information refers to a collection of multiple choice questions in which an individual describes himself and his background, with many of the questions being similar to those presented during a selection interview or on an employment application blank. The rationale involved in using such an approach is very simple--past behavior can be used as a valid indicator of future behavior and performance.

With this research as a foundation, the purpose of the present study was to ascertain the extent to which biographical data could be applied to increasing our understanding of artistic talent and how it can be identified and developed. In carrying out the study, the initial focus was concentrated upon the problems of criteria--the definition and measurement of successful performance in the arts, bridging from previous efforts in the fields of science. Such research helped define the dimensions of creative and other performances needed for successful achievement, indicating similarities across professional fields of artistic achievement as well as the unique kinds of performances which are important for achievement in particular fields of the arts. Later efforts were devoted to how these high level talents could be identified early through the use of a Biographical Inventory specially prepared for this study. Also included in this Biographical Inventory were items concerning the effects of the organizational climate on the performances of the individuals participating in the research.

The project involved the collection of multiple criterion measures which included faculty ratings on four criteria that were relevant to all areas of the arts, namely sensitivity, motivation, expression of self, and potential. Faculty assessments were also obtained for separating checklists designed to measure relevant components of performance in

the major art areas of music (instrumental and voice), visual arts, dance and theater. The items or components of performance included in each checklist were constructed on the basis of reviews of the literature, where literature existed, and interviews with faculty and student participants in the project. A final checklist, for all art areas, was employed to obtain assessments on other aspects of talent and included creativity, leadership, stimulation value, and a control measure for likeability. The creativity checklist items comprising the creativity measure were adapted from previous research on scientists and engineers. In addition to the faculty rating and checklist measures, criteria were also collected on peer nominations, number of awards, chair position in orchestra or in band and Grade Point Average (GPA) in both major and minor courses in the arts. A final set of data included control variables such as age, experience, sex, grade or class level in school, and the likeability measure. The possible contaminating effects of these variables on the criteria were investigated.

The Biographical Inventory was comprised of 300 questionnaire type of items, as described above. The inventory was separated into four major sections, which included: general biographical items, general climate items, climate items specific to the arts, and biographical items specific to the arts. The majority of the general BI items were adapted from previous research on predicting criteria for success in creative endeavors for scientists and engineers. A section of items which previously were highly valid for predicting academic performance for 11,000 high school students were also included in the general biographical items. It was therefore possible to score the general biographical items with two scoring procedures developed in previous research, namely a scientific and engineering creativity scoring procedure and an academic performance scoring procedure. The general climate items were adpated from a previous research investigation on the relationships between organizational climate and scientific performance. Finally, the climate and biographical sections of the Biographical Inventory specifically designed for the arts represented new items constructed specifically for the present research.

The specially developed version of the Biographical Inventory, with the climate section was administered to four samples of secondary school students. The four samples of students were obtained from: (1) the Interlochen Arts Academy, Interlochen, Michigan; (2) the Governor's School, Winston-Salem, North Carolina, and (3) two high schools in Salt Lake City, Utah. The samples of students from the Governor's School and the two high schools were subdivided into students in the arts and students with little or no background in the arts. The non-arts students (for whom criterion data in the arts were not available) provided an opportunity to compare the responses in the Biographical Inventory between artistic and non-artistic students.

With this overview of the design, the more specific intent of the study can be presented, which was to provide information about the following issues that are all concerned with understanding artistic talent and how it can be identified and developed.

1. What are the relationships between different multiple criteria of performance in the arts, both within and across fields of the arts? Secondly, to what extent are these criteria affected by control or contaminating measures?

2. How effectively can biographical data predict artistic performance across fields of the arts and within major fields of the arts?

3. Do a priori scoring procedures for life history data, developed to predict creativity in science and engineering, validly predict performance in the arts?

4. If life history information effectively predicts artistic performance, would such information differentiate art and non-art students?

5. What kinds of life history information differentiate the students interested in the arts from those not interested in the arts, when special scoring procedures are utilized to predict an art versus non-art criterion?

6. Will the biographical characteristics which differentiate art from non-art students also have validity in predicting artistic achievement in a sample of art students?

7. Do the more successful art students view their artistic climate in ways which differ from the less successful art students?

8. Do art and non-art students have differing perceptions of general academic climate?

9. What are the interrelationships among measures designed to predict scientific, artistic, and academic performances?

10. What are the validities of standardized achievement and intelligence tests in identifying artistic talent?

This report will procede by reviewing known research efforts on the identification of scientific and artistic talent, followed by a detailed presentation of the experimental design, the statistical results, a review of the most significant biographical and climate items, and finally, a discussion and summary of the implications of the research.

CHAPTER II - REVIEW OF THE LITERATURE

The need for development of new measurement procedures for the arts is particularly pertinent when the current state of testing in the arts is considered. A relatively small amount of work has been completed in the arts compared to the time invested and the number of psychological tests in areas such as academic achievement and personality. Anastasi (1961), in her standard text on a survey of psychological tests, stated:

> The development of tests specifically designed for measuring aesthetic abilities. . . has been slow and sporadic. Little progress in the testing of artistic, musical, or literary aptitudes has been made since the early 1940's. In number, scope, and technical refinements, tests in this area have lagged far behind other aptitude tests. (p. 400)

This survey will be presented in three parts. The first section will present an introduction to and a review of the measurement of artistic performance. The second section of the survey will present a review of research studies conducted by the investigators utilizing biographical and climate data in studies of scientific and academic performance which provided a foundation for the present study. The third section of the survey will present a review of studies concerned with the identification and prediction of artistic performance.

Measurement of Artistic Performance

A thorough assessment of professional performance in almost any area of endeavor is a relatively difficult problem, and few investigators have examined it thoroughly or have been willing to devote much of their efforts tc it. This problem, which is called the criterion problem in psychological literature, is of paramount importance for evaluating past studies as well as for planning future research endeavors. The few research studies which have been completed in this area, such as Taylor, Smith, and Ghiselin (1963) and Taylor, Price, Richards and Jacobsen (1965), were in the fields of science and medicine and have demonstrated that the assessment of total performance is dimensionally complex. A number of relatively separate dimensions involving different topics and/or sources of information have invariably been found to be necessary to adequately encompass the assessment of total professional performance. For example, Guion (1961, p. 145) has stated:

> A broad and useful definition of a criterion is behavior or consequences of behavior, that one wishes to predict. The fallacy of the single criterion lies in its assumption that everything to be predicted is related to everything else - that there is a general factor in all criteria accounting for virtually all of the important variance in behavior at work and its various consequences of value.

Dunnette (1963, p. 252) has similarly stated:

> The point of all this is to suggest that much selection and validation research has gone astray because of an overzealous worshipping of the criterion with an accompanying will-o'-the-wisp searching for a best single measure of job success. The result has been an over-simplification of the complexities involved in test validation and the prediction of employee success.

The definition and measurement of different kinds of performances set the stage for later prediction studies and, in addition, such studies provide information about the importance of and the ways in which institutional controls, sanctions, and procedures restrict or otherwise affect the various dimensions of performance. The kinds of performances that are rewarded may or may not be those which objective judges would consider to be the most relevant.

In attempting to review research on criteria in the major art areas of music, theater, dance and the visual arts, it was found that a wealth of information existed for the visual arts, while very little if any written information existed for the other three art area. Due to this paucity of information for three of the four art areas, the investigators conducted extensive interviews with faculty and student participants in the study prior to the construction of performance measures for these areas. Additional assistance was also received from noted individuals in the areas of music and dance in the preparation of the criterion measures for these two areas. Therefore, the review of performance in the visual arts will be based upon a literature review, while the reviews of music, theater and dance will be based upon a composite record of information provided by interviewees (faculty and students) and noted experts in the field in the case of music and dance.

Before presenting the above reviews, however, it is appropriate to discuss some problems that have concerned the entire performance measurement process. An important question arose early in the research concerning a "nomothetic" versus "idiographic" criterion measurement approach. Nomothetic measurement assumes that general laws exist which explain human behavior, while an idiographic approach to criterion measurement does not assume general laws operate to explain human behavior, but rather, there must be a completely individualized or case study approach to measurement for each person. By using a nomothetic approach it is possible to employ measurements across individuals on such constructs as motivation, creativity, aesthetic quality, etc., by making comparisons across individuals on a variety of measuring devices. On the other hand, comparisons across individuals, or placing individuals in a hierarchy on a common scale, is not possible when using the completely individualized idiographic approach.

Psychological research, and most scientific research for that matter, generally employs a nomothetic approach to the measurement of

human performance, although supplemental idiographic data provide a more encompassing and knowledgeable composite of information. The crucial question, however, was whether a nomothetic approach could be employed in measuring artistic performance criteria. One type of support for the nomothetic approach is the present use of this type of evaluation in the arts, such as the comparisons of individuals in the visual arts on a spontaneous-deliberate scale (to be presented later in this report), and the assignment of "chairs" in an orchestra. Further evidence for the use of the nomothetic approach to the measurement of artistic performance has been provided by Beittel (1964, p. 381) in relation to judgment of performance in the visual arts. "Judges may not always be sure of what is good, but their agreement on average and poor works quite well." Lowenfeld and Beittel (1959, p. 7) have stated: "We can make some distinctions between the higher creative from less creative people in the arts, but not reliable differentiations with those who are the tops." Robertson (1969) has further stated that good judgments of competency can be made within the lower 90 percent in music; however, differentiations within the upper 10 percent is extremely difficult.

From the above information, it would appear that reliable judgments using nomothetic measurement can be made on artistic performance if something approaching the full scale of possible abilities is employed, while attempting to make distinctions within the upper end of the scale would be unreliable. Since the present study was concerned with large samples of secondary school students at various points on scales concerned with different measures of artistic performance, the investigators felt a nomothetic approach to the measurement of artistic performance would be both appropriate and reliable. While some further information would have been provided by idiographic forms of measurement, these types of data would have been highly specific (individual) in nature and not in accordance with the goal of generalizability of this study. This should not be construed to mean, however, that idiographic measurement does not have an important place in assessment of individual artistic performance.

A second problem in the measurement of artistic performance arose with the early use of the word "creative." While many authors in artistic and non-artistic fields have attempted to define creativity, no single definition has been generally accepted either within an area or across areas. To highlight this problem a brief review of the literature and information provided by interviewees on "what is creativity" is presented below.

In reference to investigations of creativity in general, a number of somewhat oblique definitions for creativity exist. Ghiselin (1964, p. 228) has stated: "The more creative the contribution, the more it restructures man's universe of understanding." Lacklen (1964, p. 229), in assessing the creativeness of scientific products, felt that: "The more creative the contribution, the greater the area of science that the contribution underlies and therefore the greater its breadth of applicability." A third definition of creativity has been: "Creative thinking consists of forming new combinations of associative elements, which combinations either meet specified requirements, or are

in some way useful. The more mutually remote the elements of the new combinations, the more creative the process or solution" (Mednick and Mednick, 1964, p. 55). Taylor and Ellison (1964), after a large and comprehensive study of criteria which underly performance in science, concluded that: "All our experience and all the research results to date indicate that no single chracteristic by itself accounts for much of the total phenomenon of creativity; in other words, many human characteristics are usually involved in making creative contributions." (p. 243-244)

The above definitions of creativity and descriptions of the creative process illustrate the complexity involved in attempting to define and describe creativity, even when related to one area of endeavor such as science. Attempts to define and/or describe creativity in the arts have maintained this degree of complexity. In the visual arts, Kincaid (1964, p. 110) defined creative imagination as the "ability to project uncommon forms, symbols, color arrantements, and interpretations. . ." Brittain (1964, p. 118) described creativity as ". . .constructive, productive behavior. . .individuality as far as the individual is concerned; that is, it does not need to be a unique phenomenon in the world." In music, Robertson (1969, p. 1) has described creativity accordingly: ". . .when one speaks of creativity in music, it is generally felt that this refers to the construction of a composition by someone with talent and ability." Two interviewees on the faculty of one of the schools studied provided further definitions for music. The first interviewee agreed essentially with Robertson that creativity in music is seen through composition, arrangement-rearrangement and rewriting of music for an instrument other than that for which it was originally composed. However, the second interviewee felt that a musician is creative every time he plays, as he expresses an individual mode of expression in relation to his feelings toward the music being played.

In theater, the interviewees felt there were two somewhat different types of creativity. One type of creativity concerned the actual writing of the play, while the other type of creativity pertained to each actor's characterization, i.e., creating of a part. In dance, the interviewees again provided multiple types of creativity. According to different interviewees, creativity could be demonstrated by composition and arrangement in dance, individual development of a modern form of dance, and, although there was considerabl disagreement, characterization in character ballet.

On the basis of the above information, it is obvious that a definition for creativity, either across areas of human performance or within particular areas of human performance, has not been and is not in the immediate offing. Due to the complexity and controversy concerning creativity, the investigators chose to define criterion dimensions that were assumed to be underlying the creative process rather than use the word creativity as a dimension per se.[1] These performance or

---

[1]With the exception of a composite creativity checklist developed in previous research.

criterion dimensions will be presented in a later section of this report. At this time, an in-depth review of the different potential criterion dimensions for the major art areas including visual art, music, dance and theater will be presented.

Criterion research in the visual arts. A wealth of research information is available concerning criterion assessments of products in the visual arts. While the majority of these assessments rely upon judgmental ratings, a laudable attempt has been made to construct "process centered" evaluations in addition to "product centered" judgments. This review will attempt to highlight both process centered criteria and product centered criteria as displayed by prominent research in the visual arts area.

Studies by Burkhart (1960, 1962) have been concerned with developing a criterion in which evaluations are made on the basis of the "student's working process through the analysis of the product." (Burkhart, 1964, p. 87) This criterion was defined as "spontaneity" versus "deliberateness". Burkhart (1964, p. 87) has defined the above terms in reference to artistic products as:

> 'Spontaneous Handling' is defined in terms of freedom or ease in movement in the use of materials and rendering of forms. It is the opposite of deliberateness. It is essentially fluid or unpremeditated art. It increases with speed and variety of movement, and with decisiveness of statement. It may often be identified by the variety of strokes, some of which may be very sensitive or delicate, some, vigorous and bold. It usually contributes texture to the work. It reveals through this variety of movements the pattern of the creative process.
>
> 'Deliberate Handling' is a judgment of the stiffness of the handling of the total work -- of the placement and treatment of the material. It is associated with a high degree of rigidity in these respects. Although it is thus a partly negative term, the name deliberate seems preferable here becuase of the negative connotations associated with rigidity. At the higher levels in this group, the work does appear to be more deliberate in the classical sense rather than simply rigid.

In an investigation of the relationships between the spontaneity and deliberateness, various measures of divergent-convergent thinking, and personality variables, Burkhart (1964) attempted to identify attributes of creativity and personality structure for students in the visual arts. Creative students in the arts were found to score high on measures on four dimensions of personality-creativity: spontaneous abstract orientation, divergent power, ideational and perceptual openness, and social self-determination.

A series of studies by Beittel (1959, 1961, 1964) has demonstrated the complex nature of criteria for the visual arts as well as the attributes related to progression in the arts. Following a survey of accumulated research, Beittel (1964) stated that ". . .where progress in art is made, it is related to an increase in spontaneity" (p. 383). However, Beittel felt that the process criterion developed by Burkhart, i.e., spontaneous versus deliberate, should be accompanied by a quality or product measure such as "aesthetic quality." The need to evaluate art products on a spontaneous-deliberate continuum as well as for aesthetic quality was described by Beittel (1964, p. 383-384) in the following manner:

> What this means in the studying of creativity in the arts is that we predict for aesthetic quality and spontaneity of products separately. As an instance of this distinction, spatial aptitude tests usually relate at about .30 with aesthetic quality judgments of products, but not with spontaneity judgments. Conversely, creative personality predictor scales often relate to spontaneity judgments, but not to aesthetic quality.

The use of the constructs of "aesthetic quality" and "creativity" have been somewhat vague in the visual arts, which points to the complex nature of the phenomena. Several authors have, however, attempted to provide at least partial operational definitions for the above and related constructs. Kincaid (1964), in a study concerning the assessment of various creative attributes of children as relfected through drawings, defined aesthetic quality as:

> This term is interpreted in this study as that aspect of pictorial expression which reflects various characteristics such as beauty, pleasing relationships, and successful composition. The basic elements of art expression are to be considered with reference to this term, e.g., rhythm, value pattern, emphasis, line, texture, color, and proportions. (p. 110)

In stressing the need to differentiate between aesthetic quality and creative imagination, Kincaid defined creative imagination pertaining to children as:

> It was surmised that with regard to child art, the term creative imagination more accurately describes creativity and is less subject to misinterpretation. Creative imagination is interpreted in this study as the ability to project uncommon forms, symbols, color arrangements, and interpretations, as seen in the drawings of chilren and adults. This term refers primarily to imaginative ability per se and is not to be confused with skill, neatness, drawing ability, or beauty. (p. 110)

Brittain (1952) has defined creativity as:

> . . .constructive, productive behavior which can be seen either in actions or accomplishments. It also implies originality of thinking in so far as an individual is concerned: that is, it does not need to be a unique phenomenon in the world. It also implies an uncoerced individual contribution, but does not mean that the thoughts, actions, writings, inventions, drawings or paintings must spring from a source outside the experience of the individual concerned. (p. 118)

While the above definitions of aesthetic quality, creative imagination and creativity lack scientific precision, it must be remembered that research in the arts, with accompanying attempts to define constructs, has only recently been initiated. In a comparative sense, the construct creativity has not been defined with any more scientific rigor in the arts than by investigators in the multivariate intellectual domains (Guilford, 1964), multiple talents (Taylor, Ghiselin, and Yagi, 1967), science (Lacklen, 1964), etc. What is apparent for the arts, as well as for investigations in intellectual areas, education, science, etc., is that a multitude of future research will be required before the complex construct of creativity, and likewise aesthetic quality, will be understood.

To continue with criteria in the visual arts, Child (1964) has described three modes of aesthetic response, namely: judgment ("it's good"), preference ("I like it"), and sensitivity ("it's right). Barkan and Hausman (1956) have suggested a concept bound-percept bound continuum for assessing individuals in the visual arts. The concept bound individual approaches his artistic endeavors with a "clear image" of what he is going to accomplish, and then proceeds by following fixed images or previously held expectations. In contrast, the percept bound individual does not approach his artistic endeavors with a clear, fixed image of what he is going to produce, but rather is open to "many avenues of choice." The percept bound individual has the facility to change directions as cues emerge from visual stimuli. The work of Barkan and Hausman concerned describing the individual and his "set" for producing artistically. In this sense, the concept bound-percept bound continuum would not be directly applicable for the assessment of a painting, a piece of sculpture, etc. However the close parallel between the concept bound-percept bound continuum and Burkhart's deliberate-spontaneous continuum is readily apparent. Since the deliberate-spontaneous continuum has been employed successfully as a process measure for artistic judgment, it would seem that the concept bound-perceptual bound continuum could also be adapted for use in the evaluation of artistic products.

Lowenfeld (1957) has differentiated individuals in the visual arts on the basis of the visual-haptic continuum. The visual-haptic continuum is concerned with art products directly, and relates these products to the characteristics of the individual as they influenced the direction of artistic production, thereby providing a process criterion. Lowenfeld (1957, p. 262-267) has described the visual versus haptic individual

in the following manner:

> The visual type, the observer, usually approaches things from their appearance. He feels as a spectator. . . Visually minded persons have a tendency to transform kinesthetic and tactile experiences into visual experience. . .
>
> The main intermediary for the haptic type of individual is the body-self. . . In his art, the self is projected as the main actor of the picture whose formal characteristics are the resultant of a synthesis of bodily, emotional, and intellectual apprehension of shape and form. Sizes and shape are determined by their emotional value in size and importance.

Rusch (1969) has stated in reference to graphic media that an artist "creates with forms through his sketches." The artistic creation is comprised of a series of "form-sketches," each of which is further modified in reference to a particular artistic goal. When changes are made in the form of a form-sketch, Rusch believes that "certain symbolic and artistic operations are influencing each change in a manner which is often outside the artist's awareness, knowledge, and control." (p. 477) Two of these operations are known as: (1) leveling and sharpening, and (2) insight or major reorganization.

Rusch investigated the effects of leveling and sharpening and reorganization on graphic art through the use of three criteria which "work together to produce a picture of artistic behavior." (p. 478) These criteria were: (1) continuity or a judgment of continuous versus discontinuous across consecutive form-sketches, (2) clarity of form, and (3) relevance to a final goal. The results of this study provided the following information:

> Perhaps the most interesting conclusion concerns the interplay of leveling and sharpening with reorganization. Leveling and sharpening operate principally as clarifying agents which lead the artist toward stronger forms. Thus, theirs is primarily a short-term action.
>
> In contrast, reorganization seems to operate primarily as an agent of long-term direction. It acts to direct the incremental activity toward the long-term goal, starting the artist over again in a new "location," if necessary. However, its effect in clarifying the form is equivocal. Similarly, the effect of leveling and sharpening on the long-term goal is equivocal. (p. 478)

Eisner (1964) has provided a typology for investigating creative behaviors in the visual arts. This typology is predicated upon the assumption that no single quality defined creativity in visual arts,

but rather creativity included a wide variety of attributes which could "be classified into a system of types." (p.128) Eisner's typology is presented in Table 1. The vertical axis presents four possible types of creativity, namely: (1) Boundary pushing, (2) Inventing, (3) Boundary breaking, and (4) Aesthetic organizing. The horizontal axis presents "two loci in the visual art product within which creativity can be displayed." (p.129)

Eisner's typology for creativity in the arts is quite interesting in that it presents a more global and complex view of creativity than might be obtained from Burkhart's deliberate-spontaneous continuum or Barkan and Hausman's concept bound-percept bound continuum. However, investigations by Burkhart, Beittel and Brittain have demonstrated that increases in creativity in the arts were related to an increase in spontaneity. Perhaps a rational conclusion in the judgment of creativity in the visual arts would be the use of the more parsimonious deliberate-spontaneous continuum for initial judgments of artistic products, and the employment of Eisner's typology for continued and further investigations of the creativity of form and subject. Rusch's leveling and sharpening and reorganization and Lowenfeld's visual-haptic continuum would also be pertinent to investigations of creativity in the visual arts and underlying behavior dimensions of artists.

As pointed out by Beittel and Kincaid, the study of creativity does not alone account for all possible criterion variance in judgments of visual art products. Beittel and Kincaid stressed the need to provide assessments for aesthetic quality, on the basis that creativity and aesthetic quality were somewhat unrelated. Perhaps the most comprehensible description of aesthetic quality was provided by Child (1964) in which three kinds of aesthetic response were provided. These responses were: judgment, preference and sensitivity.

Criteria for music. Invaluable insights into the understanding of musicians, composers and their work were provided by Dr. Leroy Robertson, noted composer and a consultant for the present project. Robertson (1969) described music as offering ". . .many opportunities for a person to become creative." (p. 1) In reference to internal movement and structure, Robertson (1969, p. 5-6) described music in the following manner:

> Music's great appeal is in its power to move forward in time at a proper pace. In order to do this, its structure most represent a perfect balance between content and design, regulated by the controls of relaxation versus tension and stability versus energy or propulsion.
>
> There are many devices which contribute to the life of music as it moves forward in time. Some of these are: rhythmic force, use of accents, comparative dynamic levels, conceptual involvement, harmonic or some other type of texture and tonal or some other type of color.

Table 1

GENERAL CHARACTERISTICS OF EACH TYPE AND LOCUS OF CREATIVITY

Behavior	Locus	General Characteristics
1	2	3
Boundary pushing	Subject	The extension of ordinary subject matter through novel combinations of such subject matter or through their novel elaboration
Boundary pushing	Form	The extension of common forms by the novel combination of such forms or by their novel elaboration
Inventing	Subject	The production of new subject matter through the combination of known subject matter
Inventing	Form	The production of new forms through the combination of known forms
Boundary breaking	Subject	The production of new subject matter through the creation of the completely new or through reversing the premises upon which old subject matter was developed
Boundary breaking	Form	The formulation of utterly new forms
Aesthetic organizing	Form	The ordering of specific forms so as to constitute a coherent, harmonious, and balanced whole

During personal interviews, Dr. Robertson provided four general criteria by which composition in music could be conceptually evaluated. Due to the abstract and encompassing nature of these criteria, it was hypothesized that these criteria could be employed as general measures of ability and performance across the different artistic areas. The four criteria were:

(1) Logic, which can be seen by an intuitive unfolding of an idea through technique, craftmanship, performance, etc.
(2) Aesthetics, a release of uninhibited emotion, feelings, etc., toward nature in the pursuit of beauty and sensitivity.
(3) Metaphysics, a release of uninhibited feelings, emotions, etc., toward the spiritual and sublime.
(4) Ethical purpose which is seen when music, or art in general, is put to a purpose which is not fully artistic, such as to promote a political candidate through a "theme song."

In view of the conceptually abstract nature and the general difficulty that would be involved in evaluating the above criteria, Dr. Robertson further provided more concrete measures which could be employed in assessment of performance in music. These criteria were: pitch, rhythm discrimination, quality of tone or color, dynamics, i.e., loud versus soft accents, charisma, and balance as related to quality.

A second set of criteria for judging music performance was provided by John Dudd of the Interlochen Arts Academy during an interview. Many of these criteria were parallel or similar to those provided by Dr. Robertson; however, the second set of criteria will be provided in their entirety as the interviewee also provided certain assumptions concerning the assessments and interrelationships of the criteria. The second set of criteria was: musical feeling or sensitivity, technical facility, ability to improvise, pitch sense, rhythm sense, ability to sight read, natural vocal quality, ability to compose.

The interviewee expressed the opinion that all of the above eight criteria were natural talents and therefore could not be developed beyond a certain point. However, the interviewee carefully stressed the need for experience prior to the time of talent assessment. Time and experience would be required for the natural talent to be recognized and to be allowed to mature. Assessment at a time prior to experience would most likely fail to identify a potential or natural talent which could be latent or dormant within the individual.

A final point provided by the interviewee was the independent nature of the eight criteria. In other words, any one individual could possess natural ability in none or all eight of the talent categories. An ability in one talent category would not be related to nor imply an ability in another talent category. On the basis of this reasoning, an encompassing evaluation of performance in music would necessitate individual evaluations for each of the separate talent categories.

Criteria for dance. The following discussion of possible criteria for dance represents a composite overview of interviews received from

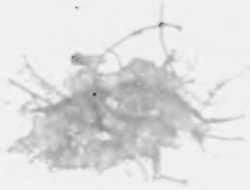
faculty and student participants in the project. Additional valuable information and a review of the final criterion forms for dance were provided by Virginia Tanner, Director of the Children's Creative Dance Program, University of Utah. While the area of dance can be subdivided into the two general categories of ballet and modern dance, the description of potential criteria presented below is concentrated on performance dimensions that could be implemented for evaluation purposes across the different areas of dance.

The first performance dimension was concerned with an individual's ability to adapt to the rhythm, tempo, speed, etc., of the music while dancing. A second dimension related to the ability to explore and move in space. Essentially, this ability could be measured in terms of an awareness of space while dancing. The third performance dimension pertained to a continuum designed to measure an individual's ability to convey an idea through movement. This performance dimension included physical as well as facial expressions.

The fourth dimension for evaluating individuals in dance was not directly related to actual performance, but was concerned with body structure as it related to the norm of what might, or should, be projected by a professional dancer. While this was a somewhat oblique criterion and open to some controversy, the interviewees felt that it was possible to differentiate between general body structures that would, or would not, be required of a professional.

The fifth dimension for dance was again not directly related to actual performance by an individual. This dimension was, however, extremely important in that it concerned both an individual's desire and ability to compose and arrange in dance. The sixth and final dimension for evaluating dance was one of the most important of the four actual performance dimensions. This potential assessment was concerned with the ability to maintain a satisfactory measure of self-discipline and avoid making mistakes. Included in this dimension were the important aspects of awareness and clarity of line, placement of the body, quality of ease, and fluidness.

Criteria for theater. The following discussion of possible criteria for theater also represents a composite of interviews received from faculty and student participants in the project. The interviewees considered the competence of an actor to be generally, or at least initially, demonstrated by the ability to characterize, i.e., put the abstract (idea) into the concrete (acting), or the ability to adapt to a character. Characterization was considered to be achieved through strenuous concentration on making a part or role realistic or concrete. The actor must concentrate to transform the "self" into the part, and not the part into the self, in order for the part characterized to be made realistic and the self lost. As seen by the interviewees, a prerequisite for this concentration and subsequent development of a realistic part is a knowledgeable image on the part of the actor of the self. The actor must understand and be sensitive to his own behavior and his interrelationships with others and the world in general before he can be sensitive to and characterize a part.



Characterization may generally be seen in the actor's ability to perform different roles or parts, his ability to improvise, and his ability to concentrate and make a part believeable within the framework of the play or style. Additional criteria for theater, which are somewhat distinct from but related to characterization, would include the actor's ability to empathize with the audience and other actors (in addition to empathizing with the part), vocal ability, the ability to maintain the rhythm, beat or tempo of the play through movement and timing, and the related ability to merge with other actors.

Studies of Biographical and Climate Data to Predict Scientific and Academic Performance

This review will focus on those studies conducted by the investigators which provided the foundation for the instruments used in the present study. The success of these instruments in different professional fields led to the hypothesis that it would be possible to predict high levels of performance in the arts by adapting these instruments for use by students in the arts.

The NASA studies. The National Aeronautics and Space Administration (NASA) studies were the initial, large scale studies concerned with the prediction of scientific performance from biographical information (Taylor and Ellison, 1967). Over 2,000 NASA scientists and engineers filled out a 300 item, multiple choice biographical inventory (BI). The objective of these studies was to exploit the biographical approach and thus determine and more fully understand the experiences, backgrounds, opinions, self-images, and attitudes which would aid in differentiating the highly productive and creative scientists from those who were less productive and creative. When these life history characteristics were identified, the practical goal was to utilize this information to develop an easily administered and scored BI which would aid in the identification of scientific talent at the college level.

Early pilot studies by Ellison (1960) and Taylor, Smith, Ghiselin, and Ellison (1961) were especially useful in laying the foundation for the later use of the biographical approach in the NASA studies. Results of the Taylor, et al. (1961) study demonstrated the predictive efficiency of the BI when an a priori scoring key for the biographical responses yielded better validities than any of the other 100 non-biographical psychological test scores that were applied to 17 different performance measures of success in science.

The NASA concurrent validity studies encompassed three separate investigations at three different NASA centers. In each center a 300 item BI was administered and criteria of performance were collected. The BI's were arranged into four sections: developmental history, parents and family life, academic background, and adult life and interests. The criteria of performance were of three types: criteria available from the official records at each of the NASA research centers, data on the number of publications and the number of patents collected from the scientists, and criterion measures which were constructed by the investigators for research purposes only and were completed by

immediate supervisors. The criterion measures developed by the investigators included: a productivity checklist, a creativity checklist, and a seven step creativity rating scale. Both the creativity checklist and the creativity rating scale were constructed on the basis of Lacklen's (1964) formulation for measuring creativity, namely, that the creativity of a contribution can be determined by its breadth of applicability.

The data analyses followed in each NASA center were identical. In each center, the sample of scientists was randomly divided into two subsamples. A separate item alternative analysis was performed on each sample for each of the criteria. After this analysis, a variety of scoring keys and weighting of alternatives was tried so that approximately 75 to 125 items per scoring key were retained with one or more alternatives scored in each item. The empirically derived keys, constructed separately for each criterion on each of the two samples, were applied to the opposite sample so that a double cross validation design was carried out.

The average cross validities for the two creativity keys in predicting the creativity rating criterion across the three studies were .52, .48, and .41 (Taylor and Ellison, 1967). The cross validity coefficient for the best biographical score in predicting a combination of the creativity rating and the creativity checklist was .59 in the first study. Cross validity coefficients of .60 and .62 were obtained for predicting number of publications in the second and third studies. The official rating scores which were already available at the research centers were generally not as predictable as the other criterion measures, evidently because of the construction of the rating forms and the manner in which these ratings were obtained.

These results in a new field, involving important and difficult to predict job criteria, compared favorably with the best results that have been obtained in the well researched area of academic success, or any other prediction studies. Moreover, the stability and generality of the BI was demonstrated by scoring the biographical data from the second and third studies with the keys from the first study and correlating the key scores with the creativity rating criteria collected in the later studies. These results provided evidence that there is common ground among criterion measures of creativity, and that a biographical score constructed to predict creativity, even when constructed at a different geographical location, can overlap a significant portion of that common ground.

The Ethyl study. This study (Ellison, James, and Carron, 1968) was concerned with the identification of creative scientific talent from life history data--information concerning past behaviors, experiences, and self-descriptions, etc., that could be used as indicators of future performance. The biographical data, cast into multiple choice questions, were based upon four years of research on over 2,000 NASA scientists.

In this study, 18 criterion measures of scientific performance were collected on 203 scientists and engineers from two geographical

locations. All 18 of the criterion measures, including ratings, rankings, salary measures, number of patents, publications, etc., were predicted by Form K of the Biographical Inventory with cross validities significant beyond the .01 level. The cross validities ranged from .56 for a composite criterion of salary and creativity and .55 for a composite of patents and creativity to .19 for quantity of work. Eleven of the 18 cross validities were above .40. The validities obtained in this study were considerably higher than the usual results obtained in most testing studies and indicated that biographical data could make a significant contribution to the identification of scientific talent.

The North American Rockwell study. In this study (Ellison, James, McDonald, and Taylor, 1968) complete biographical (Form N) and criterion data were available for 294 scientists and engineers engaged in applied research activities from five divisions of a large aerospace research company. The criterion data included 14 measures, such as salary (corrected for experience), ratings by supervisors on creativity, skill with people, quantity of work, number of publications, patents, etc., plus combinations of these measures. The results showed a consistent pattern of generally moderate and significant cross validities, e.g., .42 for a combination of creativity and patents, .42 for subject matter knowledge, and many others in the .20's, .30's, and .40's, indicating further generality and applicability of biographical data in predicting scientific performance criteria.

The Dow Chemical study. Sixty different criterion and control scores were analyzed on 296 scientists and engineers from a number of Dow locations in terms of their relationships to Biographical Inventory scores (Form O) and to 152 other predictor measures (Ellison, James, Fox, and Taylor, 1968). The other predictor measures included scores from the Miller Analogies, the MMPI, the Strong Vocational Interest Inventory, etc. Cross validities for the BI were most often in the .40's against the various criterion measures. When 20 of the most relevant criteria were selected for a separate analysis, all of the selected BI key scores had statistically significant relationships with all 20 of these criteria while the next most valid scores was the Kuder Literary score which had a significant relationship with 10 of the 20 selected criteria.

Of particular interest was the comparative lack of validity of intelligence tests and college grade point average for the majority of criteria on this sample of industrial scientists and engineers. The only criteria for which the intelligence tests were valid (validating generally only in the .20's) were those which were school-like in nature, such as written communication. In other words, a variety of talents were important for high level performances, talents which were not adequately measured by either intelligence tests or college performances.

In each of the previous industrial studies (i.e., Ethyl, North American Rockwell, and Dow Chemical), the scoring key developed on the basis of the previous NASA research studies had significant validities against a variety of criteria. In the Dow and North American Rockwell studies, the IBRIC creativity key paralleled and sometimes exceeded the

validities of the empirical creativity keys specifically constructed within each study, indicating the general utility of biographical data in predicting scientific performance criteria across different research specialties, geographical locations, industries, etc.

Each of the studies also involved some experimentation in combining various criterion measures to develop more comprehensive and predictable composite criteria. It is believed that further research in this area will provide guidelines so that meaningful combinations of individual measures can be developed which will more adequately assess different dimensions of high level performance and generalize across organizations.

The Alpha study. In this study, a high school version (grades 9-12) of the Biographical Inventory was administered to over 11,000 high school students in North Carolina (IBRIC, 1969). The results indicated that the Academic Performance Score was consistently more valid in predicting academic performance criteria--grades and teacher evaluations--than any of the other 24 scores from intelligence tests and achievement measures included in the study. Equally important, the Academic Performance Score did not show the usual pattern of discrimination in terms of race, which has characterized conventional approaches to the identification of talent.

The Creativity Score, based on the responses of all previous studies on scientists and engineers from government and industrial research laboratories, had a pattern of low to moderate relationships with conventional measures of talent and criteria of academic achievement. The Creativity Score was independent of race with no significant differences in the scores of Negro and White students.

Related biographical data studies. Chambers (1964) studied the personality and biographical factors of mature scientists who were highly creative in research work and those of scientists who were much less creative. In addition to significant differences between creative scientists and their comparative control groups on several personality variables, he also found significant differences for 16 biographical items. He was thus able to present a biographical and personality profile of those highly creative scientists and those not so creative.

Kulberg and Owens (1960) and W.A. Owens and his associates (1960, 1962) have made several studies of engineers and scientists and reported significant relationships between biographical data and criteria of creativity, professional interests, and research competence. In another study, Albright and Glennon (1961) found that biographical information could discriminate between supervisory and research-oriented scientists at all levels of a laboratory organization. Also, Smith, Albright, and Glennon (1961) demonstrated the value of the personal history technique in the prediction of scientific competence and creativity within a highly select group of research scientists.

In a study by McDermid (1965) of the technical and engineering personnel of the Hammond Organ Company, it was found that only biographical data proved to be significant as predictors of both supervisory

and peer ratings of creative performances. In June 1965, the National Research Conference on the use of biographical information, chaired by E. R. Henry (1965) and supported by the Richardson Foundation, produced a consensus of the 16 participants that in professional and other complex fields, the biographical approach is at least as good and is usually better than other techniques for predicting job performance.

The assessment of climate characteristics - facilitators or inhibitors. The climate in an organization has an important effect on creative and other high-level talents, for it is through the formal and informal institutionalized expectations, rewards, etc., that such talent must function. The 1966 creativity conference (Taylor, in preparation) was largely directed toward this topic and while the majority of participants reported some significant findings in this area, it is still largely unexplored. Much of the available evidence is anecdotal in nature as very few experimental studies have been conducted.

A recent study completed by the Institute for Behavioral Research in Creativity at the Naval Radiological Defense Laboratory (NRDL), Hunters Point, California (Ellison, McDonald, James, Fox, and Taylor, 1968) was concerned with the effect of organizational climate on the productivity of research personnel. The study was designed to identify what types of organizational characteristics influence how scientists work on their jobs, including information on how much influence each has and the interactions among the organizational characteristics. This research constituted an initial approach to identify, define and quantify the many variables that operate in a research organization and to determine their effect on scientific performance.

The sample studied included 216 scientists who were engaged in basic, applied or operational research. The climate questionnaire resulted in 422 variables which were designed to quantitatively assess those variables--physical, psychological and organizational--which effected performance as a scientist. The climate questionnaire was validated against 97 criterion and control measures in a cross validation design. Results of the study demonstrated that this is an extremely promising area of research as a number of major criteria of scientific performance were predicted with cross validities of .60 or above. These findings indicate that measures of organizational climate (both present and past environmental effects) can make a significant contribution to explaining variations in scientific performance.

Studies Concerned with the Prediction of Artistic Performance

Skager, Schultz, and Klein (1966) conducted a study in which initial focus was placed upon how to evaluate products in the visual arts, while later emphasis was placed upon correlating measures of psychological characteristics with different types of quality as identified in the first phases of the research. The subjects participating in the research included 191 sophomore students enrolled at the Rhode Island School of Design. The subjects were asked to provide

drawings which were then rated for "esthetic quality" by judges from the school of design, judges employed as artists at other institutions, and judges who were non-artists. An analysis of the reliability of ratings averaged across judges demonstrated a high average reliability coefficient (.93); however, inter-judge correlations revealed disagreement concerning quality ratings.

Inverse principal components factor analysis revealed that different types of quality ratings were being provided by the judges. Homogeneity of judgement was somewhat apparent on the basis of the source from which the judgement was obtained. Non-artist judges as a group gave high quality ratings to drawings that were conventional in style, while the judges from the school of design tended to rate the drawings on the basis of Burkhart's spontaneous-deliberate continuum.

Biographical information was obtained on the cultural level of the home environment and social status for approximately one-half of the subjects participating in the research. Questions included items specifically related to art, such as whether a parent was involved in an artistic occupation or hobby, and general questions concerning educational levels of parents, father's occupation as a function of social status, size of home, possessions, etc. When the biographical items were correlated with ratings on the four types of quality provided by the judges, the correlations were relatively low and generally nonsignificant. However, some information was provided by the patterns of correlations. "Taken as a group, the measures of social status and cultural background appear to provide additional evidence that characteristics of S's (or their backgrounds) are differentially related to quality of product as defined by four points of view." (p. 92)

Recent studies by Schaefer and Anastasi (1968) and Anastasi and Schaefer (1969) employed a Biographical Inventory to identify creativity in adolescent boys and adolescent girls. The research on adolescent boys involved 400 high school boys from schools in the New York metropolitan area, while the same size of sample was employed in the investigation of adolescent girls.

In the study on boys, the subjects were separated into four criterion groups, namely: (A) Creative-Artistic, (B) Creative-Scientific, (C) Control-Artistic, and (D) Control-Scientific. Subjects in the two creative groups were selected on the basis of teacher nominations which were based on creative products (visual arts and writing) and creativity tests were used for checks. Subjects in the two control groups had not demonstrated creative potential as judged by teachers and scored below minimum cutoffs on the creativity tests.

The biographical inventory employed in the research on boys contained 3,930 scoreable item alternatives. Validation and cross validation groups were constructed separately for artistic creativity and scientific creativity. For example, one-half of the Creative-Artistic sample was combined with one-half of the Control-Artistic sample for validation purposes, and the remaining Creative-Artist and Control-Artistic students were combined for cross validation purposes.

Validation and cross validation groups were matched for number of students from each school, class distribution, GPA, and mean scores on the creativity tests. The biographical inventories were item analyzed on the validation groups to predict the dichotomous criterion of creative versus control. Scoring keys were constructed and used for scoring purposes on the cross validation samples (item analysis and cross validation will be more fully explained in a later part of this report). The resulting cross validities for boys were .64 and .35 for the artistic and scientific keys respectively (each significant beyond the .001 level).

The study on girls proceeded in a similar manner, with the exception that separate creative and control groups were obtained for artistic creativity (Creative-Artistic, Control-Artistic) based on products in the visual arts, and literary creativity (Creative-Writing, Control-Writing). Creative and control groups for science were not obtained for girls. The Biographical Inventory used for girls provided a total of 3,962 scoreable item alternatives. Matched groups of creatives and controls were again constructed for validation and cross validation purposes. Separate item analyses for artistic creativity and literary creativity and cross validation of the keys resulted in a cross validity of .34 (significant beyond the .001 level) for predicting the dichotomous criterion of creative versus control in the artistic cross validation sample, and .55 (significant beyond the .001 level) in the literary cross validation sample.

The significant results of the above studies are in marked contrast to those found by Skager, et al. While biographical data generally failed to significantly predict criterion measures of artistic quality in the Skager, et al. study of art students, Schaefer and Anastasi, and Anastasi and Schaefer, found highly significant predictions of artistic ability versus lack of such ability in the visual arts using biographical data. However, there were a number of possible reasons for these different results. The Skager, et al. study used only 11 biographical items, while the studies on adolescent boys had 3,930 scoreable item alternatives and the study on adolescent girls had 3,962 scoreable alternatives. The Schaefer and Anastasi studies used much larger sample sizes and included both controls and creatives, thereby not suffering from the restriction of range effects most likely associated with the Skager, et al. study. Another important distinction between the studies was the use of cumulative scoring on the biographical data procedures in the Schaefer and Anastasi studies which provided more variance in the independent variables. A strong point can be made for the Skager, et al. study for the intensive investigation of quality of visual arts products (although other criteria exist), while criterion dimensions were examined less in the Schaefer and Anastasi studies.

In relation to the present study, the optimum procedures provided by the three above investigations were employed. Due to the various sampling procedures employed to obtain art and non-art students, restriction of range in sampling was not a problem. Secondly, the results of the present study could be generalized due to the different geographical locations of the samples. A large number of items and

scoreable alternatives were provided by the 300 item (approximately 1200 scoreable alternatives) Biographical Inventory, and cumulative scoring procedures were used. Finally, an in-depth criterion analysis preceded the validation of the biographical and climate items.

Interlochen pilot study. In order to examine the effectiveness of a Biographical Inventory for identifying talent in music students, a small, exploratory research effort was conducted at the Interlochen National Music Camp, Interlochen, Michigan in 1968.[2] The Biographical Inventory consisted of 300 multiple choice items in which an individual could describe himself and his background. The invetory contained items which had previously been found to be valid predictors of creative performances in studies of scientists and engineers in the National Aeronautics and Space Administration. The items had been adapted and rewritten to develop an instrument for predicting future creative performance for high school students in science. This instrument was used at Interlochen because of its suitability for high school age students, recognizing that many of the items were not appropriate for students in the arts.

Although data were collected on a variety of students in the arts, the analysis was restricted to a sample of 148 high school music students attending an eight week summer camp because other categories of artistic endeavors had too few students for adequate statistical analysis. The performance criteria collected on the Interlochen music students included awards won as a performer or a composer and peer nominations for outstanding composition or outstanding ability as a performer. Information was also collected on number of instruments played, number of categories of instruments played, and other measures such as grade in school, number of years studied, etc.

The results of this exploratory study were indicative of the promise of a Biographical Inventory for predicting multiple assessments of student performance in music. Special scoring procedures for the Biographical Inventory developed on the basis of the responses of the Interlochen music students and a priori scoring procedures available from the previous research on NASA scientists and engineers significantly predicted a number of the music performance criteria. An item analysis in a double cross validation design was employed to develop biographical keys on the Interlochen students. Examples of the average cross validities obtained in this analysis were .36 for performance awards ($N = 148$, $r_{.05} = .16$; $r_{.01} = .21$), .24 for peer nominations for composition ability and .20 for peer nominations for performance. The scientific and engineering a priori biographical key correlated .29 with the composition peer criterion and .20 with the composition

---

[2]This study was made possible by the cooperation of a number of people. Instrumental assistance was provided by Dr. Evelyn Perloff, Robert Lacklen and Dr. George Wilson, who provided the opportunity to conduct the research.

awards criterion.

It is noteworthy that positive results were found in this first attempt. These results were obtained in spite of the fact that the inventory was constructed for administration to high school students in science. A particularly intriguing finding was the fact that Biographical Inventory scoring keys constructed on mature scientists to predict creativity in the sciences also predicted composition awards and peer nominations of composition ability in music but did not correlate significantly with the criterion measures concerned with excellence in playing musical instruments. These findings indicate some similarities in the life history correlates of creativity across fields of endeavor and age groups. It is quite evident that well designed studies specifically directed at the arts would contribute substantially to our relatively meager knowledge of the interrelationships of the talents relevant to sciences and the arts. This pilot study also indicated that a completely new start would probably not be needed in the arts, and that it could be possible to capitalize successfully upon the findings and techniques already available from biographical studies in the sciences.

CHAPTER III - PROCEDURE

This section of the report will present a description of the samples, the development of the Biographical Inventory and climate items, the development of the multiple criteria for performance in the arts, administration of the research instruments, and procedures employed in the analysis of the data.

Description of the Samples

Biographical, climate and criterion data were collected on four major samples of students from the four secondary schools that participated in the project. The schools were the Interlochen Arts Academy, Interlochen, Michigan; the Governor's School, Winston-Salem, North Carolina; and two high schools located in the greater Salt Lake City, Utah area. A more detailed description of the samples, schools, and selection methods is presented below.

The Interlochen Arts Academy is a private, college-preparatory institution, concerned with providing a thorough liberal arts education geared to prepare students for the colleges of their choice. The Academy offers exceptional training in the arts, including the areas of music, visual arts, theater, dance, creative writing, composition and broadcasting. The Academy stresses prior proficiency in an artistic area as competence in an artistic area is used for selection purposes. With few exceptions, every student was either enrolled as a major in an artistic area or a minor in one to three different artistic areas. A student with a major in an artistic area had demonstrated sufficient competence in that area to be considered a major. Until a student successfully passed the requirements for a major, he or she was considered a minor. Students who were not yet majors were encouraged to select multiple minors, however, once a student became a major, minor areas were usually dropped. Noticeable exceptions to this were the areas of composition, creative writing and broadcasting in which students with other majors participated.

The Governor's School is a public, experimental school operated by the North Carolina Board of Education and is located on the Salem College campus in Winston-Salem. The school is composed of an eight week summer program for selected students from secondary schools in North Carolina. The school is designed to provide a variety of unique and distinctive educational and preparatory experiences for superior students in the various fields of the arts and sciences. No charge is made for the students' eight week residence, and no grades or credit are given for attendance.

Three areas of experience and training are provided in the curriculum at the Governor's School. These include: (1) the area of talent or giftedness on the basis of which the student was selected to attend the school, (2) general conceptual development, and (3) personal and social development. The areas of talent or giftedness include art, dance, drama, English, French, mathematics, music (choral, instrumental, piano), and natural science.

To attend the Governor's School, junior and senior secondary school students must be nominated by school superintendents on the basis of a high intelligence test score and superior ability on talent in an academic or artistic area. The students are then selected by audition and selection teams. The distribution of students across art and non-art areas was approximately equal. The non-art data were collected to serve as control data for the artistic sample.

The two high schools from the Salt Lake area were selected on the basis of their art courses, extra-curricular offerings in the arts, and their voluntary willingness to participate in the research. Students across the different artistic areas were nominated for participation by faculty in the arts on the basis of the faculty members' ability to provide ratings on the students. Faculty members were asked to nominate students across the full range of ability in their artistic area.

A control group of non-art students were also obtained from each of these two high schools. Each of the two control groups were approximately equal in size to that of the artistic students selected from each school. The non-art control students were selected by initially reviewing the records at each school and identifying those students who had no artistic training beyond that required by their school. A random selection was then made from this pool of students to equate the sample sizes of art and non-art students. No attempt was made to match the art and non-art samples as the investigators were concerned with investigating any differences which may have existed between art and non-art students in such variables as GPA (grade point average), achievement tests, etc..

The potential sample size for the art students across the four schools was 897 students. This included both students who had voluntarily agreed to participate and those who had not. The students who did not wish to participate by filling out a BI were evaluated on the criterion measures. This was completed in order to determine if participants were significantly different from nonparticipants on the criteria, which could result in a statistical biasing of the participant sample. For example, if students who did not wish to participate had a significantly higher, or lower, mean than participating students, then the participant sample could not be considered to be completely representative of the potential distributions of abilities investigated. Of course, the practical differences between participant and nonparticipant criterion means, as well as measures of variability, were equally as important as significant differences.

The total number of BI's received for the art sample only was 541 which represented 60% of the potential number that could have been received. However, the 60% figure was not representative of the return rates for the individual schools. Table 2 presents the return rates for the artistic sample across the four participating schools. As is evident from this table, three of the four schools had return rates of 80% or better while one art school had a return rate of 30%. In the three schools with high participation rates, the instruments were distributed and collected by the faculty, and the return of the completed

instruments was encouraged by both the faculty and the administration. However, in the art school with the low participation rate, class time was not provided by the administration for the distribution of the instruments nor was the faculty asked to collect the instruments. Despite efforts by the psychologists visiting the school, a spirit of anti-participation with the establishment could not be overcome. On the basis of this evidence, an intensive analysis of criteria for participants versus nonparticipants was conducted for the art school where participation was so low. This analysis will be presented at the end of this chapter after the available measures have been presented.

Table 2

BREAKDOWN OF RETURN RATES FOR
THE ARTISTIC STUDENT SAMPLE ACROSS SCHOOLS

	RETURN RATES		
Schools	Potential Sample Size	Number of Biographical Inventories Returned	Percent of Return
Art School A	408	118	30%
Art School B	172	165	96%
High School A	140	116	83%
High School B	177	142	80%
TOTAL	897	541	60%

The potential sample size for the non-art control sample was 572. This included students from all schools except the Interlochen Arts Academy where a control sample of non-art control students was not available.[3] The total number of BI's returned by the students in the control sample was 492 out of a possible 572, representing an 86% return rate. This return rate was quite high and was representative of the individual rates of the three schools. Subsequently, due to this high return rate, the question of differences between participants and nonparticipants was of little or no importance as the sample for whom BI data was available were representative within the limits of the sampling.

Development of the Biographical Inventory and Climate Items

The BI developed for the present study contained 300 multiple choice

[3]Although a few students at the Academy were designated "academic majors," these students had received enough training in the arts to invalidate their use in a non-art control sample.

items and was based on a series of research studies as reviewed in the survey of the literature. The BI was separated into five different sections, which were as follows.

(1) Items 1-199. These items were largely provided by a highly select group of items which had generally significant correlations in predicting creativity criteria across numerous studies on scientists and engineers. These items were carefully screened and revised to adapt them for use in secondary school samples. The items were also screened to eliminate any items that could be considered an invasion of privacy. As a further safeguard, the instructions were worded so that a participant could ignore any item he did not wish to answer. Since the range of criteria involved in this study included a number of different kinds of performance criteria, a number of the items were adapted or constructed especially for the students to provide additional coverage of the new criterion dimensions specifically developed for this study.

The subject matter of the BI items dealt generally with the four broad areas of (1) developmental history, (2) parents and family life, (3) academic background, and (4) present life and interests. In terms of underlying characteristics that were measured, the items were directed towards determining self-confidence, independence, general intellectuality, reactions to hypothetical situations, participation in non-art activities, etc. In contrast to a number of other selection instruments, such as intelligence tests, the BI does not have time limits or require controlled conditions for administration and has been highly acceptable to those completing it. This section of the BI contained the items which could be scored with the a priori IBRIC creativity key developed on scientists and engineers from the NASA and industrial studies, and the academic performance key developed on North Carolina students in the Alpha study.

(2) Items 200-217. This set of items provided the opportunity for students to describe the general climate of their school, regardless of type of school, i.e., art orientation or general high school. The items were generally selected from a pool of items which had significant correlations with productivity criteria in the NRDL climate research (Ellison, et al., 1968). The items were rewritten and adapted for use in secondary school samples. The organizational characteristics covered by the content of these items included the extent to which faculty treated students as responsible, capable individuals, opportunity to do original work, control of classroom activities, adherence to formal rules on dress and appearance, preparation for future academic endeavors, administration's degree of understanding of student's problems, etc.

(3) Item 218. This item served as a stopping point for the non-art control students. The content of the item was concerned with the student's voluntary activities and interest in the arts. If a student responded he was not interested in the arts and had not selected courses in the arts beyond required courses, he was instructed to stop at this point and not answer any of the remaining questions in the BI.

(4) Items 219-251. This set of items was concerned with the organizational climate of the schools as it related to performance in the arts. The items were partially obtained from the pool of successful NRDL items, while another set of items was constructed from the information provided by art faculty and art students during interviews. The item content covered areas of climate such as the degree of structure involved in artistic training, descriptions of other students as a group in the arts, reaction to artistic competition, perceived competence of faculty in the arts, equipment and facilities, leadership qualities of faculty, etc.

(5) Items 252-300. This set of items was directly concerned with the biographical characteristics of students in the arts. Since a majority of the items directly concerned previous artistic endeavors, it was not possible for the control students to complete this section of the BI. The items were constructed on the basis of items from the IBRIC creativity key and from information provided during interviews.[4] Dr. Leroy Robertson was instrumental in constructing and revising the items.

In addition to the BI, scores on achievement tests previously administered by the schools were accumulated for all samples of students. These tests included the National Merit Scholarship Qualifying Test (NMSQT), the Preliminary Scholastic-Aptitude Test (PSAT), the American College Test (ACT), and the National Educational Development Tests (NEDT). Scores from these tests were validated against the multiple criteria of artistic performances and compared to the BI for differential predictive effectiveness (described in the data analysis section of this report).

Development of the Criterion Measures of Performance

Previous research on scientists and engineers (Taylor and Ellison, 1967) and investigations in other fields (e.g., Dunnette, 1963) had provided strong evidence that no single measure, score, or source of information provides an adequate description of the many kinds of contributions made in professional job performance activities. By obtaining a composite picture from different measuring instruments across different dimensions of performance, a more encompassing evaluation of performance may be obtained together with some increase in the reliability of the measures. Thus, in the present study, multiple criterion measures representing relatively different dimensions of performance in the arts were collected for members of the artistic sample in order to obtain a more accurate representation and coverage of performances of students in the arts. In addition, newly developed checklist items were administered for assessing different facets of artistic performance.

Success may be measured differently in different environments and by different groups. The criteria used in this study were intended to

---

[4]Although IBRIC creativity items provided stimuli for the construction of items in this section of the BI, it was not possible to develop an a priori scoring key due to the unknown validity of the items in an art sample.

be relevant and realistic measures of success for students across artistic areas. These criteria were selected partly from measures already available from school records, partly on the basis of earlier work on NASA and industrial scientists from which reliable criterion measures of on the job performance were adapted for students in the arts, and partly from specific research, literature reviews and interviews on criterion development for artistic performance for this study. Table 3 presents a partial list of the criteria for the artistic sample and the source from which each was obtained. The actual criterion forms are presented in Appendix A.

The rating and checklist information was provided by a faculty member in the artistic area in which the student was majoring at the Interlochen Arts Academy and the Governor's School, and by the faculty member who nominated the student at the two Salt Lake City high schools. The return rate for the rating information was excellent at all schools; however, a number of students in the arts were not rated at the Governor's School because of lack of adequate knowledge of their abilities and potentials.

The rating forms on sensitivity, motivation, expression of self and potential were largely developed from information provided by the interviews with faculty and students; although, previous research on creativity in scientific and engineering samples provided supplemental information in the development of the motivation and expression of self scales. The scales were designed to be utilized across the different areas of the arts. Secondly, with the exception of the potential scale, the scales were designed to encompass variance which was attributable to the creative process.

The expression of self scale was perhaps the measure most directly related to the creative process, as it required an evaluation of the degree to which a student projected a distinctive personal style which reflected a free and independent interpretation and production of artistic subject matter. The motivation rating required an evaluation of the extent to which a student constantly strived to make full utilization of artistic talent and excel according to ability. While motivation alone does not guarantee creative performance, research has substantiated the important role of motivation in the creative process. The sensitivity scale required evaluations on each student's demonstrated ability to recognize significant characteristics in the artistic environment which reflected an openness of perception and an ability to differentiate and select things of artistic merit. Again, sensitivity to an environment, whether it be artistic or scientific, is known to be a necessary, but not sufficient, condition in the creative process.

Five separate checklists were constructed to further define and evaluate the more global rating scales by viewing a number of different components of performance. A separate checklist was constructed for each of the four major artistic areas, e.g., visual arts, music, dance and theater. Each of these checklists sought to encompass important measurable components of successful performance in each of the four areas. Each checklist was comprised of six separate items which were developed on the basis of the information provided by the literature

Table 3

MULTIPLE CRITERIA AND THEIR SOURCES
FOR STUDENTS IN THE ARTS

Criteria	Source and Method of Measurement
Sensitivity	Faculty (Rating Form)
Motivation	Faculty (Rating Form)
Expression of Self	Faculty (Rating Form)
Potential	Faculty (Rating Form)
Music (6 items)	Faculty (Checklist)
Visual Art (6 items)	Faculty (Checklist)
Dance (6 items)	Faculty (Checklist)
Theater (6 items)	Faculty (Checklist)
Creativity (3 items)	Faculty (Checklist)
Leadership (1 item)	Faculty (Checklist)
Stimulation Value (1 item)	Faculty (Checklist)
Technical Competence	Peer Nominations
Personal Style	Peer Nominations
Number of Awards	Self-report
Chairs	School Records
Academic GPA	School Records
Artistic GPA	School Records
Art versus Non-art	School Records
Area of Artistic Endeavor	School Records
Control Variables	
Sex	School records and BI answer sheet
Age	School records and BI answer sheet
Grade in School	School records and BI answer sheet
Experience in Arts*	BI item 14
Likeability	Faculty (Checklist)

*Note. This item was used as a control score only and was excluded from all item analysis procedures described throughout the study.

review, interviews and advice of experts as presented in the previous chapter of this report. For example, the checklist items for music included items in which evaluations were made on: (1) ability to improvise, (2) sense of pitch, (3) sense of rhythm, (4) ability to sight read music, (5) natural vocal quality, and (6) ability to compose music. In a similar manner, the items in the visual art, dance and theater checklists were written to parallel the important determinants leading to success in these areas.

The fifth checklist, entitled "Overall Checklist Evaluation," was comprised of four different measures across six items. The first overall checklist item examined the faculty member's relationship to those he or she evaluated and was designated likeability. Likeability was used as a control measure to examine the extent to which the likeability of the student was associated with the evaluation. Three creativity checklist items (items 2, 3, and 6 provided by previous research on scientists and engineers) were embedded within the overall checklist. The three items were designed to measure three aspects of creativity--initiative, quantity of ideas, and quality of ideas--and were summed to provide a creativity checklist score. Item four furnished information on leadership abilities, while item five was concerned with each student's stimulation or catalytic value in relation to other students.

Additional rating information was provided by the students themselves in terms of peer nominations. Four peer nomination variables were employed. Students were asked to nominate outstanding performers in their main area of artistic interest for: (1) technical competence across class levels, (2) technical competence within his own class level, (3) distinctive personal style across class levels, and (4) distinctive personal style within his own class level. The peer nomination data were available for the Interlochen sample only. This was due to the fact that peer nomination data would not have been appropriate for the two high schools as only a sample of the students in the arts participated in the study, and time was not available to obtain peer nomination data at the Governor's School.

Additional performance criteria included a self-reported number of awards. This information was coded and scaled for quantity and quality differences in awards as will be explained in a later section of this report. A measure concerning competence in instrumental music at Interlochen was supplied by the chair position in the orchestra or band. Chair position was standardized (mean = 50, standard deviation = 10) by instruments in the coding of the data. Grades in major area of artistic interest, minor area(s) of interest, and academic areas were also available for all schools except the Governor's School where grades were not given. Description and identification data for each student in both the art and the non-art samples included art versus non-art, school, and area of artistic endeavor for artistic students. Control data were also obtained to ensure that certain variables did not inordinately effect measurement of the performance and rating criteria. The control measures included age, grade, sex, experience and the previously mentioned likeability measure.

Administration of the Research Instruments

Psychologists visited each of the four participating schools on at least two occasions. The visiting psychologist(s) met with the administration and faculty in group or individual meetings to discuss the nature of the study and emphasize the criterion problem. The meetings provided an opportunity to discuss the importance of completing the criterion forms correctly and how the forms were to be completed. An important consideration was to instruct the raters to make their evaluation on demonstrated performance only (except for the potential rating), and not on age, academic training, likeability, etc. Also, special emphasis was placed on the fact that the evaluations would be used for research purposes only and reported in terms of group relationships.

The BI's were distributed to the members of the samples through their instructors, through group meetings of the students, or through a mail system at the school. The psychologists remained at the Interlochen Arts Academy for a period of approximately six days to assist the students and faculty as they completed the inventories and criterion forms. Self-addressed, stamped envelopes were provided for the return of the remainder of the data.

Data Analysis

Initial data analysis procedures were concentrated on rescaling certain criterion measures, constructing identification variables, and constructing the art and non-art samples. The self-report number of awards data and the peer nomination measures were rescaled in order to obtain approximately normal distributions of the data (although the data were not normalized). The award data were rescaled by weighting each award as a function of difficulty of achievement. Awards provided by a school were given a weight of 1, local area awards were given a 2, state level awards were given a 3, and national level awards were given a 4. After each award had been weighted, a composite score for each individual was computed. However, the distribution of these scores was positively skewed, which was subsequently reduced by a rescaling of the scores on a 0 to 4 continuum. Number of peer nominations on each of the four nomination variables was also rescaled to reduce skewness. Three of the four new scales received a 0 to 4 continuum, while one scale (technical competence-own class level) was valued in terms of a 0 to 3 continuum.

The identification variables included art versus non-art, major versus minor (Interlochen only), and a subset of dichotomous variables identifying main area of artistic endeavor. The latter subset of variables included the following art areas: visual arts, theater, dance, creative writing, speech, music (instrument), music (voice), etc. The creative writing and speech measures were included because a small number of participating students, 12 and 7 respectively, identified these as their areas of main artistic interest, and some classes were offered in these areas at participating schools.

The art and non-art samples were separated into three different

samples on the basis of school records and responses to the BI. These samples and their respective sample sizes were as follows.

1. The art sample (N = 501) was comprised of students in the arts for whom complete biographical data were available. This sample was employed for the analysis of artistic criterion performance and the item analysis of the BI to predict artistic performance.[5]

2. The non-art short form sample (N = 312), hereafter referred to as the non-art SF sample, was a sample of non-art control students who completed the first 218 items of the BI. These students were considered to be the most realistic non-art control students because both the school records and the students themselves verified little interest in the arts.

3. The non-art long form sample (N = 167), hereafter designated the non-art LF sample, was comprised of students who were identified in school records by their lack of participation in the arts, but who voluntarily chose to complete the 300 item form. It was assumed that these students had participated in artistic endeavors outside of the school system to the extent they felt they could complete the inventory. These students were analyzed separately as some question concerning the extent of their artistic effort was present.

Prior to any statistical analyses, all BI's were checked for missing data, i.e., no response to a subset of items. All BI's with more than a specified number of missing items were deleted. For all samples on which the 300 item form was available, BI's with more than 19 blank items were deleted. For samples with 218 items completed, BI's with more than 10 blank items were deleted. The resulting number of BI's dropped was 12 for the 300 item forms and 13 for the 218 item forms.

In order to provide an overview of the analysis of biographical and climate data, the major analyses are summarized in Table 4. These procedures are discussed throughout the balance of this chapter. This table may be helpful as an orientation guide throughout the balance of the report.

Table 4 does not show the intercorrelation analysis of the performance criterion data, identification data, and situational and control variables for the art sample which preceded the item analysis procedures. This analysis provided the opportunity to examine the interrelationships among performance criterion information and correlations between performance criterion data and the identification measures. Criterion composites were developed after a review of the criterion intercorrelation analyses. These composite criteria were obtained

---

[5]Data were also obtained on 28 art students who completed only the first 218 items even though school records and teacher nominations indicated they had participated extensively in the arts. No analysis was completed on this sample due to the small sample size and the unknown nature of the sample.

Table 4

DESCRIPTION OF SAMPLES AND STATISTICAL
TREATMENT OF BIOGRAPHICAL AND CLIMATE DATA

Sample and N	Brief Description of Analysis	Items Analyzed
Art N = 501	1. Item analysis - double cross validation design to determine the validity of biographical and climate data in predicting artistic achievement in a sample of art students.	1-300
	2. Scored with BI keys resulting from analysis #4 below to determine the validity of biographical data in predicting artistic achievement when such data resulted from an analysis of art versus non-art students.	1-199
	3. Item analysis - total sample to construct scoring keys for biographical data to examine the extent to which art students could be differentiated from non-art students by BI keys related to artistic performance.	1-199 and 252-300
Art-Non-art SF N = 813	4. Item analysis - double cross validation design to determine the extent to which biographical data would differentiate art from non-art students.	1-199
	5. Analysis #4 above also included the general climate items (200-217) to examine the responses of art versus non-art students.	200-217
Non-art SF N = 312	6. Scored with BI keys (1-199) resulting from analysis #3 above to determine the extent to which keys constructed to predict artistic performance separated art from non-art students.	1-199
Non-art LF N = 167	7. Scored with BI keys (1-199 and 252-300) resulting from analysis #3 above to determine the extent to which keys constructed to predict artistic performance separated art from non-art students.	1-199 and 252-300

from different sources of information with the underlying rationale that a combination of criteria, each of which assessed a relevant aspect of performance, would result in a more predictable, comprehensive, and reliable criterion. Since the criteria were intended to be relevant measures of performance, a combination of measures assessing different aspects of success may have provided a more meaningful standard against which to validate the BI as long as the composite was acceptable in terms of its relevance. No attempt was made to develop a global or general overall composite based upon all or most criterion measures, but rather composites were constructed by combining variables encompassing a general theoretical area of performance.

Statistically, the composite development procedure involved examining relationships between criterion measures and developing composites of criteria by equal weighting the variance for each variable entering into the composite. No attempt was made to otherwise weight the variables, as recent research by James (1970) has demonstrated the lack of effect on validity for differential weighting procedures in criterion composites.

In order to estimate the validity of the BI for the art sample in predicting the various criterion measures of artistic performance, an item analysis was carried out in a double cross validation design. Prior to the item analysis, the BI's were scored with two a priori keys developed in previous research. Those scoring keys included the IBRIC Creativity Key and the Academic Performance score. The validities for these keys will be reported in conjunction with the results of the item analysis.

For the item analysis, the art sample was divided randomly into two subsamples. Each subsample was item analyzed separately to establish scoring weights for the items which differentiated between various levels of performance on each of the criterion measures. These item weights were then used to score the BI's of the students in the other sample in order to determine the effectiveness of the instrument on an independent group.

More specifically, biserial and point biserial correlations were computed for each alternative of each question for each criterion. After these correlations were computed, all the correlations were screened for statistical significance. A scoring key (BI key) was then generated for each criterion consisting of all alternatives which had significant biserial correlations with that criterion. The alternatives with significant positive correlations were weighted plus 1 and those with negative correlations were weighted minus 1. The scoring keys for each criterion were then used to score the responses of the subjects in the second subsample. These scores were then correlated with the criterion measures to obtain cross validity coefficients. Conversely, the second subsample also served as a means of developing another set of scoring weights which, when applied to the first subsample, produced a second estimate of cross validity coefficients.

The reason for this method of analysis is that the use of the same group (the total sample for instance) for both the development of the scoring weights and the application of these weights usually produces results which are spuriously high and thus fail to give a satisfactory estimate of the effectiveness of the instrument. Cross validation of the scoring keys on a separate sample provides an estimate of the effectiveness of the procedure on another independent group.

The double cross validation design used in the present study generally provides two estimates of the cross validities. However in the present study, a different procedure was utilized to simplify the presentation of the results. The cross validities for the total sample were obtained by merging the results of both cross validation runs. The cross validated keyscores obtained for each student from one of the two cross validation runs were merged with his/her criterion scores and an intercorrelation matrix was computed on the total sample. This run was designated the total sample cross validation analysis, and included the cross validities for the BI scoring keys on criteria for which they were developed and all other criteria.

In order to simplify the analysis further, all possible criterion measures were not entered into the item analysis, nor were BI keys generated for all criteria. However, the keys were cross validated against all criteria regardless of whether the criterion was employed for key building purposes. The criterion measures retained and those on which scoring keys were constructed were selected on the basis of importance, relevancy, non-homogeneity and fewer cases of missing data.

A number of the identification criteria and control variables were included in the item analysis; although, scoring keys were not constructed on these measures. These sets of variables were entered into the item analysis in order to examine their relationship with scoring keys.

Included within the double cross validation analysis were cross validities for each separate section of the BI against the performance and identification criteria, as well as correlations with the control variables. For example, the first section of the BI, items 1 through 199 as described previously, was examined separately in terms of predictive efficiency against the criteria. The same analyses were conducted for BI items 252 through 300. The climate items were treated as one subset of items, i.e., items 200 through 251 excluding item 218, because of the small number of items included between items 200 and 217. These analyses provided the opportunity to ascertain the predictive effectiveness of general BI items versus artistically oriented BI items, BI items versus climate, etc. Cross validities for all BI items combined were also computed. The procedure for examining the differences in perceptions of climate between art and non-art students on items 200 through 217 will be presented later in this section of the report.

A final set of predictor variables included in the item analysis were scores on standardized academic achievement tests. Scores on

these tests were validated against each of the multiple criteria of artistic performance and compared to the BI for differential predictive effectiveness.

A second double cross validation item analysis was conducted on the combined art and the two non-art samples to predict an art versus non-art criterion. Essentially, this was the same procedure as employed in the Anastasi and Schaefer studies (1968, 1969), although males were not separated from females. In this analysis, one half of the art sample was combined with one half of the non-art samples for key building purposes, while the remaining subjects were combined for cross validation purposes so that a double cross validation design could be carried out. The only criterion entering into this item analysis was the art versus non-art criterion, and only the first 199 BI items were used for cross validity purposes. This analysis was carried out to determine what kinds of life history experiences differentiate art students from non-art students and also provided an opportunity to compare the predictive efficiency obtained in the present study to that obtained in the Anastasi and Schaefer studies. However, the present investigators were more concerned with the analysis and prediction of multiple criteria of artistic performance obtained in the previous item analysis on the art sample. Climate items 200 through 217 were also item analyzed, but cross validities were not computed. The analysis of the climate items provided the opportunity to compare responses of art versus non-art students to separate climate items that correlated with the art versus non-art criteria.

Following the double cross validation analyses, a total sample item analysis was completed for the art sample. The keys developed in this run were not cross validated as they were constructed by examining the valid relationships between the BI item alternatives and selected criteria on the total art sample. The criteria were selected for key building on the basis of their judged relevancy to performance and their predictiveness in the cross validation analysis. These keys were constructed on all subjects of the art sample to obtain highly stable scoring procedures for the BI data and would be the optimum keys to use for future predictive purposes. These keys were used to score the non-art (SF), non-art (LF), and art samples for comparisons of mean BI key scores among the art and non-art samples. The comparisons between the art and non-art samples provided information concerning the extent to which valid BI scoring keys, built to predict artistic performance, could differentiate between artistically oriented and non-artistically oriented students.

Following the double cross validation analyses, the total sample item analysis on the art sample and the comparisons of the art, non-art SF and non-art LF on the total art sample BI keys, a separate chapter of the report will present a discussion of the most effective BI and climate items obtained in the above analyses. This chapter will be divided into four sections, corresponding to the major analyses of

the BI and climate items. The first section will discuss the BI items included in the most valid BI key obtained in predicting the performance criteria for the art sample. The second section will present from the climate items (200 through 217 and 219 through 251) the most valid climate key obtained in predicting the performance criteria in the art sample. The third section of this chapter will provide a discussion of the 199 BI items that were most valid in predicting the art versus non-art criterion in item analysis of the combined art and non-art SF samples (second item analysis). The fourth and final section of this chapter will present a review of the most valid 17 climate items that significantly correlated with the art versus non-art criterion in the second item analysis.

Of crucial importance to the generalizability of the results in the above analyses was a comparison of participant versus nonparticipant criterion data for students in the arts. Participants were those art students who completed a BI, while nonparticipants were those art students who did not complete a BI but for whom criterion data were available. The method of comparison employed was the t-test, to ascertain if significant differences existed between criterion means for the two groups. Since BI return rates were substantial for all schools except one, the participant versus nonparticipant analysis was conducted on this sample only. As presented previously, this analysis was conducted in order to determine both the statistical and practical generalizability of the information for students on whom BI data was obtained

The results of the participant versus nonparticipant analysis are presented in Table 5. The criteria were selected for this analysis on the basis of sample size and representativeness. The control scores for grade in school and sex were also included. The results of the t-tests revealed that participant and nonparticipant samples were not significantly different on seven of the nine comparisons. Participants had significantly higher means on the motivation rating and the number of awards criteria; although the practical differences were small. Therefore, on the basis of the above analysis, it was concluded that the criterion data obtained for participants was representative of all students at the school.

Table 5

COMPARISONS OF MEANS OF THE BI PARTICIPANTS
WITH THE BI NONPARTICIPANTS FOR CRITERION AND CONTROL VARIABLES

Criteria and Control Scores	PARTICIPANTS			NONPARTICIPANTS			
	Mean	S.D.	N	Mean	S.D.	N	t
Sensitivity Rating	8.90	3.20	93	8.43	3.39	211	1.18
Motivation Rating	9.06	3.36	93	8.08	3.56	211	2.33*
Expression of Self Rating	8.54	3.33	93	7.83	3.63	211	1.69
Potential Rating	6.54	3.35	91	6.09	3.46	209	1.07
Music Checklist Mean	2.62	6.24	76	2.60	6.42	135	1.64
Number of Awards	2.51	.62	93	2.30	.58	211	2.74*
Major Area GPA	4.49	.53	79	4.35	.65	158	1.02
Grade in School	11.08	.97	119	10.98	1.00	282	1.00
Sex (Female=0, Male=1)	.40	.49	118	.44	.50	279	-.73

*Significant at the .05 level.

CHAPTER IV - RESULTS

This section of the report will be presented in subsections parallel to the major statistical analyses that were performed on the data. The subsections include, among others: (1) the criterion and control score intercorrelation analysis for the art sample, (2) the item analyses of the art sample and combined art and non-art samples, and (3) comparisons between art and non-art samples on the biographical keys constructed in step 2 and on other pertinent variables.

Criterion and Control Score Analysis for the Art Sample

The means, standard deviations and sample sizes for the art sample on the criteria and control scores are presented in Table 6. The total possible sample size for any variable included in this matrix was 501 although for most variables the N was smaller since some criterion data were not obtained at one of the art schools as described previously. Variables 1 through 4 represent the rating criteria, with sample sizes varying between 320 (potential rating) and 356 (motivation rating). Variables 5 through 32 represent the different checklist items and checklist means for the music, visual art, dance and theater checklists. The sample sizes (N's) were noticeably smaller for the checklists compared to the ratings due to the fact that students were separated by major artistic area, i.e., music students were only rated in music, etc. The music checklist had the largest sample size (149, variable 11), followed by the visual arts checklist (102, variable 18), the theater checklist (54, variable 32), and finally, the dance checklist (52, variable 25). Variables 33 through 39 were the overall checklist items and creativity mean score (variable 39). Larger sample sizes were obtained for these variables (360-377) because all students were rated on these measures regardless of art area.

In reviewing the rating and checklist means and standard deviations, the four ratings generally had means approaching 9.0, with the exception of the potential rating ($\bar{X}$ = 6.0). The theoretical mean for all rating scales was 8.0, indicating that three of the four means were skewed slightly toward the upper end of the rating continuum, possibly indicating a small amount of positive leniency in the ratings. The opposite was true for the potential scale, which demonstrated negative leniency. However, the standard deviations for the four ratings were all above 3.00, which, in comparison to previous research employing the same rating format, were quite high and indicated more than adequate variance. All of the checklist item means and standard deviations were satisfactory.

Variable 40 was the self reported number of awards measure (N = 344). The mean of 1.22 reflected the rescaling of the variable which represents approximately 2 awards per student. Variables 41 through 44 were the rescaled peer nomination data. The rather small sample sizes for these variables (52) was due to the fact that these data were obtained only at Art School A on a subsample of students who turned in the peer nomination data. Only those students who received at least one nomination were included in this variable, as inserting zeroes for those not nominated would most likely have been

Table 6

MEANS, STANDARD DEVIATIONS AND SAMPLE SIZES
OF CRITERION AND CONTROL SCORES
FOR THE ART SAMPLE

Item No.	Description	Means	S.D.	N
	Ratings			
1.	Sensitivity Rating	8.92	3.29	342
2.	Motivation Rating	9.08	3.48	356
3.	Expression of Self Rating	8.52	3.34	341
4.	Potential Rating	6.00	3.35	320
	Music Shecklist			
5.	#1 Ability to Improvise	2.38	.97	125
6.	#2 Sense of Pitch	2.62	.64	144
7.	#3 Sense of Rhythm	2.28	.68	147
8.	#4 Ability to Sight Read	3.64	.95	148
9.	#5 Natural Vocal Quality	2.80	.85	97
10.	#6 Compose	1.82	1.23	101
11.	Music Checklist Mean	2.63	.66	149
	Visual Arts Checklist			
12.	#1 Aesthetic Quality	1.84	.70	102
13.	#2 Understanding of Self	2.51	.84	84
14.	#3 Clear Image of Projects	2.18	.74	101
15.	#4 Creative Imagination	2.39	1.02	102
16.	#5 Involvement and Persistence	2.58	1.01	102
17.	#6 Use of Different Types-Media	1.96	.65	83
18.	Visual Arts Checklist Mean	2.27	.69	102
	Dance Checklist			
19.	#1 Adapt to Music	3.17	.86	52
20.	#2 Awareness of Space	2.67	.90	52
21.	#3 Expression Through Movement	2.71	.85	52
22.	#4 Body Structure	2.40	.69	52
23.	#5 Composition and Arrangement	2.81	.91	52
24.	#6 Self Discipline	2.90	.98	52
25.	Dance Checklist Mean	2.78	.74	52
	Theater Checklist			
26.	#1 Theatrical Talent	2.19	.62	54
27.	#2 Perform Different Roles	2.00	.87	54
28.	#3 Improvise	1.72	.71	54
29.	#4 Make Part Believeable	2.06	.68	54
30.	#5 Communicate with Audience	1.93	.70	54
31.	#6 Understanding of Self	2.56	.77	54
32.	Theater Checklist Mean	2.08	.54	54

Table 6

(continued)

Item No.	Description	Means	S.D.	N
33.	#1 Likeability	2.53	.59	376
34.	#2 Creativity	2.80	.91	377
35.	#3 Creativity	2.15	.71	374
36.	#4 Leadership	3.12	1.18	364
37.	#5 Stimulation Value	1.95	.65	365
38.	#6 Creativity	2.07	.77	360
39.	Creativity Mean (34,35,38)	2.44	.60	377
40.	Self Report Number of Awards	1.22	.95	344
41.	Peer Nom:Tech.Compt.-Any Lvl.	1.37	1.41	52
42.	Tech.Compt.-Own Lvl.	1.02	1.11	52
43.	Personal Style-Any Lvl.	1.94	1.49	52
44.	Personal Style-Own Lvl.	1.52	1.46	52
45.	Chairs	57.45	14.23	49
46.	Major vs. Minor	.71	.45	105
	Area of Arts			
47.	Visual Arts	.22	.42	459
48.	Theater	.12	.33	459
49.	Dance	.15	.36	459
50.	Creative Writing	.03	.16	459
51.	Speech	.02	.12	459
52.	Music (Instrument)	.32	.47	459
53.	Music (Voice)	.14	.34	459
	School			
54.	Art School A	.21	.41	501
55.	High School A	.26	.44	501
56.	High School B	.21	.41	501
57.	Art School B	.32	.47	501
	Grade Point Average (GPA)			
58.	Major Art Area Mean	44.77	7.32	287
59.	Minor Art Area Mean	42.73	6.45	84
60.	Maj.-Min. Art Area Comb. Mean	44.42	6.99	314
61.	Academic Mean	37.48	7.70	315
	Control Scores			
62.	Experience BI #14	3.47	1.03	501
63.	Age	16.51	.94	497
64.	Grade	11.20	.84	488
65.	Sex	.39	.49	500

more misleading due to the rather meager percent of participation at this school. On this basis, restriction of variance was undoubtedly operating with the peer nomination data.

Variable 45 was chair position in the orchestra for the instrumental music students at Art School A (N = 49) who completed a BI. This variable was standardized by instruments to provide a mean of 50 and a standard deviation of 10. Divergence from these two values was due to the small samples in some instrument areas, which resulted in only approximate standardizations. Variable 46 was major versus minor for the Art School A sample (N = 105). It was apparent from the mean of this variable that 71% of these students in the art sample were majors in different areas of the arts.

Variables 47 through 53 were the dichotomous variables for artistic area (excluding minors at Art School A where multiple minors were present). For example, on variable 47, all students in the visual arts were given a 1, while all other students were given a 0. Therefore, the mean score on each of these variables, multiplied by 100, gives the percentage of students in the art sample in each artistic area. On this basis, 32% of the students for whom the art area measure was available (N = 459) were in instrumental music, 22% were in the visual arts, 15% were in dance, 14% were in vocal music, 12% were in theater, 03% were in creative writing, and 02% were in speech. It should be mentioned at this time that speech majors were actually students selected for other fields of art who reported speech as their main area of interest.

Variables 54 through 57 represent the four different schools. Again, these variables were dichotomous, and therefore the means represent proportions, or percentages when multiplied by 100. It is evident from this information that no one school predominated in the art sample, as percentages varied only from 21% (Art School A and High School B) to 32% (Art School B). Variables 58 through 61 are the different GPA variables. Variable 58 is GPA in main area of artistic interest (N = 287), variable 59 is GPA in minor area(s) of artistic interest (N = 84), variable 60 is GPA in both main and minor art areas (N = 314), and variable 61 is GPA in academic, non-art areas (N = 315). The grades were coded so that 10 was a failing grade (E or F) and 50 was an exceptional grade (A). It is evident from this information that students in the arts had significantly higher GPA's in the arts (variable 60) than in the academic areas (correlated t-test, $t = 14.77$, $p < .001$).

The final set of variables in Table 6 were the control scores, amount of experience (variable 62), age (variable 63), grade (variable 64), and sex (variable 65). The experience measure was obtained from a BI item, and the mean of 3.47 indicated approximately 6 to 7 years of experience in the arts. The mean age was 16.51 and the mean grade level was 11.20, or junior year in secondary school. For the sex variable, females were coded 0 and males were coded 1. Therefore, 39% of the sample was male while 61% was female.

The correlations between the criterion and control variables are

presented in Table 7. Since the sample sizes for particular sets of correlations differed across variables, the sample size corresponding to each correlation is presented in Table 8. The varying sample sizes must be taken into consideration in determining the significance of correlations. The correlations will be discussed in terms of subsections of the table. For example, the intercorrelations of the ratings will be reported initially, followed by correlations between the ratings and the checklists, ratings and number of awards, etc., until all correlations between the ratings and all other variables have been discussed. This descending order of presentation, i.e., descending down the matrix across rows, will be followed throughout the discussion of the matrix.

The intercorrelations among the four rating scales (variables 1 through 4) were, without exception, quite substantial, with correlations varying between .66 and .78. A pattern of lower intercorrelations would have been desireable because relatively independent dimensions of performance could have been identified. The pattern of high intercorrelations evidently reflected a lack of independence among the rating dimensions; however, it is also likely that the correlations reflected a "halo effect," indicating the raters were influenced by an overall or general impression of the ratee, which in turn inhibited differential ratings across the dimensions. The ratings had a range of relatively high (.51 to .60) and high (.60+) correlations with the checklist means (variables 11, 18, 25, 32 and 39). These high correlations indicated that the components of creativity rating scales and the potential measure (variables 1-4) were generally adequate measures of performance within each of the separate art areas. The three creativity component ratings also correlated .70 or .71 with the creativity checklist mean (variable 39), indicating the rating measures were directed toward a creativity construct. However, the problem of halo contamination was still likely. The individual checklist items generally had a very meaningful pattern of relationships with the ratings indicating construct validity in spite of the high relationships among the ratings. For example, ability to improvise correlated highest with sensitivity and expression of self; ability to sight read correlated highest with motivation; composition ability correlated highest with self expression; and this pattern continued throughout the remaining checklist items. These relationships will be discussed further when the individual checklist items are examined.

An enlightening set of results were the relatively low correlations between the ratings and the likeability control measure (variable 33), which varied between .12 and .27, with the exception of motivation rating (.34). This indicated the ratings were not unduly effected by likeability of the ratee as likeability accounted for less than 12% of variance, at a maximum, in the rating scales.

The correlations between the ratings and the number of awards (variable 40) varied between .27 and .44, and thus were relatively independent. These correlations indicated that somewhat different dimensions of performance were measured and also reflected differences due to source variance. The ratings generally evidenced low to moderate correlations with the peer nomination data, chairs, and major

Table 7

CORRELATIONS OF CRITERION AND CONTROL SC

No.	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	1
	Ratings															
1.	Sensitivity Rating	--														
2.	Motivation Rating	74	--													
3.	Expression of Self Rating	78	71	--												
4.	Potential Rating	77	66	70	--											
	Music Checklist															
5.	#1 Ability to Improvise	58	48	56	49	--										
6.	#2 Sense of Pitch	41	37	39	49	23	--									
7.	#3 Sense of Rhythm	73	55	63	64	53	36	--								
8.	#4 Ability to Sight Read	67	73	64	68	47	42	60	--							
9.	#5 Natural Vocal Quality	39	40	32	38	42	23	27	38	--						
10.	#6 Compose	44	41	50	49	50	19	36	44	22	--					
11.	Music Checklist Mean	64	64	64	65	76	56	74	78	61	73	--				
	Visual Arts Checklist															
12.	#1 Aesthetic Quality	78	67	78	70	00	00	00	00	00	00	00	--			
13.	#2 Understanding of Self	68	76	69	54	00	00	00	00	00	00	00	62	--		
14.	#3 Clear Image of Projects	54	61	53	54	00	00	00	00	00	00	00	55	57	--	
15.	#4 Creative Imagination	81	71	85	78	00	00	00	00	00	00	00	71	56	46	-
16.	#5 Involvement and Persistence	74	81	75	61	00	00	00	00	00	00	00	70	74	64	6
17.	#6 Use of Different Types-Media	69	66	76	68	00	00	00	00	00	00	00	66	60	44	6
18.	Visual Arts Checklist Mean	86	85	89	78	00	00	00	00	00	00	00	86	81	72	8
	Dance Checklist															
19.	#1 Adapt to Music	62	61	52	44	00	00	00	00	00	00	00	00	00	00	0
20.	#2 Awareness of Space	70	74	60	63	00	00	00	00	00	00	00	00	00	00	0
21.	#3 Expression Through Movement	65	83	64	61	00	00	00	00	00	00	00	00	00	00	0
22.	#4 Body Structure	57	54	47	54	00	00	00	00	00	00	00	00	00	00	0
23.	#5 Composition and Arrangement	74	81	73	60	00	00	00	00	00	00	00	00	00	00	0
24.	#6 Self Discipline	64	66	55	65	00	00	00	00	00	00	00	00	00	00	0
25.	Dance Checklist Mean	77	82	69	67	00	00	00	00	00	00	00	00	00	00	0
	Theater Checklist															
26.	#1 Theatrical Talent	08	-08	03	15	00	00	00	00	00	00	00	00	00	00	0
27.	#2 Perform Different Roles	60	45	63	66	00	00	00	00	00	00	00	00	00	00	0
28.	#3 Improvise	56	51	73	69	00	00	00	00	00	00	00	00	00	00	0
29.	#4 Make Part Believeable	75	80	77	64	00	00	00	00	00	00	00	00	00	00	0
30.	#5 Communicate with Audience	70	58	78	63	00	00	00	00	00	00	00	00	00	00	0
31.	#6 Understanding of Self	59	63	44	53	00	00	00	00	00	00	00	00	00	00	0
32.	Theater Checklist Mean	75	65	76	74	00	00	00	00	00	00	00	00	00	00	0

[1] Decimal points have been omitted.

Table 7

I AND CONTROL SCORES FOR THE ART SAMPLE[1]

2	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Table 7

(continued)

No.	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Overall Checklist														
33.	#1 Likeability	27	34	23	12	10	01	35	25	15	00	23	37	51	48
34.	#2 Creativity	60	59	61	53	38	40	52	60	27	42	59	55	57	46
35.	#3 Creativity	49	52	47	40	20	24	43	26	27	14	34	53	54	64
36.	#4 Leadership	61	59	63	48	36	42	48	59	28	44	53	52	58	41
37.	#5 Stimulation Value	44	49	37	29	11	10	29	26	28	00	23	36	47	35
38.	#6 Creativity	56	54	62	53	32	42	40	58	39	45	53	61	59	46
39.	Creativity Mean (34,35,38)	70	71	70	57	42	43	62	65	39	42	64	65	70	59
40.	Self Report Number of Awards	27	28	30	44	-02	33	17	38	26	14	27	29	06	21
41.	Peer Nom:Tech.Compt.-Any Lvl.	51	34	35	46	42	08	36	39	11	-09	20	87	50	87
42.	Tech.Compt.-Own Lvl.	33	34	26	36	24	17	26	38	25	13	22	50	00	50
43.	Personal Style-Any Lvl.	51	50	43	53	52	16	18	22	-10	22	13	97	72	97
44.	Personal Style-Own Lvl.	17	09	27	25	27	17	17	24	-16	19	18	50	00	50
45.	Chairs	41	37	47	52	27	02	34	60	14	67	50	00	00	00
46.	Major vs. Minor	28	11	10	40	31	20	23	21	17	07	16	00	00	00
	Area of Arts														
47.	Visual Arts	-09	-13	-07	-20	00	00	00	00	00	00	00	00	00	00
48.	Theater	-06	-05	-04	04	00	00	00	00	00	00	00	00	00	00
49.	Dance	-06	12	06	-05	00	00	00	00	00	00	00	00	00	00
50.	Creative Writing	13	-07	02	07	00	00	00	00	00	00	00	00	00	00
51.	Speech	09	05	10	00	00	00	00	00	00	00	00	00	00	00
52.	Music (Instrument)	06	00	-05	18	00	00	00	00	00	00	00	00	00	00
53.	Music (Voice)	07	13	08	00	00	00	00	00	00	00	00	00	00	00
	School														
54.	Art School A	-03	-02	00	10	-33	07	-06	-08	-14	-08	-02	12	09	00
55.	High School A	-03	-11	-06	-22	14	-25	18	-05	00	00	-10	-05	-12	-11
56.	High School B	00	06	00	03	13	18	-03	07	-06	09	05	-19	08	-17
57.	Art School B	06	10	08	12	13	-06	-05	08	24	00	06	22	00	34
	Grade Point Average (GPA)														
58.	Major Art Area Mean	46	60	45	37	41	18	21	48	08	10	33	52	54	54
59.	Minor Art Area Mean	34	16	21	09	30	11	-02	30	-08	16	11	69	51	53
60.	Maj.-Min. Art Area Comb. Mean	48	57	43	36	46	25	31	49	07	12	34	52	54	52
61.	Academic Mean	24	37	22	11	-06	-06	17	10	-06	-08	00	26	47	48
	Control Scores														
62.	Experience BI #14	16	15	14	17	00	10	19	24	00	19	15	07	-07	-04
63.	Age	16	09	11	16	16	08	09	21	09	11	12	10	13	10
64.	Grade	22	17	19	27	23	11	07	25	16	06	16	12	14	14
65.	Sex	07	04	07	11	28	-02	15	05	-22	21	14	07	-03	02

Table 7

ontinued)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
51	48	34	43	42	51	49	26	25	19	29	32	35	-06	04	15	-01	17	42	17
57	46	57	58	64	64	38	32	35	17	43	27	38	13	40	45	48	56	48	57
54	64	54	67	58	71	40	48	39	31	51	41	49	31	60	40	61	57	51	68
58	41	65	66	64	69	57	54	53	40	73	50	64	13	55	38	56	56	51	62
47	35	47	52	46	52	31	49	58	29	48	29	47	-21	22	30	52	39	27	35
59	46	71	63	68	74	56	43	44	39	70	58	61	38	68	52	57	70	36	73
70	59	73	76	73	83	62	58	57	40	70	51	66	16	61	53	67	71	60	75
06	21	33	12	30	30	-06	-03	10	-31	16	-11	-03	-15	15	05	35	25	02	16
50	87	87	87	87	80	00	00	00	00	00	00	00	00	100	00	00	00	00	100
00	50	50	50	50	39	00	00	00	00	00	00	00	00	100	00	00	00	00	100
72	97	97	97	97	93	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	50	50	50	50	39	00	00	00	00	00	00	00	00	100	00	00	00	00	100
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	50	50	50	50	39	00	00	00	00	00	00	00	00	100	00	00	00	00	100
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	61	29	-38	41	41	00	21
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
09	00	09	14	01	09	00	00	00	00	00	00	00	22	22	31	16	22	19	29
-12	-11	-19	-05	11	-13	19	-04	-03	-05	14	09	07	51	00	-31	-24	-06	-04	-02
08	-17	00	-05	-12	-10	-16	11	21	08	-04	-02	02	-23	10	08	09	12	08	05
00	34	20	04	00	23	-06	-14	-33	-06	-18	-12	-17	-38	-22	02	04	-18	-14	-18
54	54	57	66	59	68	23	43	44	31	39	39	43	-44	35	50	68	57	64	53
51	53	65	67	71	71	04	40	70	81	24	50	52	45	34	04	26	11	-06	26
54	52	58	66	59	68	20	42	39	33	35	36	40	-35	45	50	74	62	61	60
47	48	42	59	44	54	27	27	03	19	00	18	19	-26	-04	16	36	12	30	13
-07	-04	01	-08	-02	-04	36	40	31	31	36	23	38	-14	02	11	13	10	-03	04
13	10	07	08	08	10	-10	00	16	04	07	02	04	16	13	08	13	07	11	14
14	14	16	04	-04	12	-10	-02	17	05	10	06	05	26	18	05	16	09	25	21
-03	02	22	15	17	16	00	00	00	00	00	00	00	06	-04	-05	-07	-13	09	-02

Table 7

(continued)

No.	Description	33	34	35	36	37	38	39	40	41	42	43	44	45
	Overall Checklist													
33.	#1 Likeability	--				·					·			
34.	#2 Creativity	21	--			·					·			
35.	#3 Creativity	30	36	--		·					·			
36.	#4 Leadership	19	64	46	--	·					·			
37.	#5 Stimulation Value	26	42	40	52	--					·			
38.	#6 Creativity	21	58	43	62	45	--				·			
39.	Creativity Mean (34,35,38)	45	79	67	86	70	79	--			·			
											·			
40.	Self Report Number of Awards	00	14	08	17	15	21	16	--		·			
41.	Peer Nom:Tech.Compt.-Any Lvl.	06	25	26	24	06	26	23	20	--	·			
42.	Tech.Compt.-Own Lvl.	02	06	34	23	-12	05	15	49	58	--			
43.	Personal Style-Any Lvl.	11	34	35	27	-02	14	33	25	68	52	--		
44.	Personal Style-Own Lvl.	-20	02	12	24	-34	-09	00	03	30	65	49	--	
45.	Chairs	17	40	18	51	-12	64	41	41	78	60	36	36	--
46.	Major vs. Minor	-07	14	14	21	-06	24	17	09	16	15	33	06	-04
	Area of Arts													
47.	Visual Arts	03	-01	-06	-11	-15	05	-07	-23	16	-12	21	-08	00
48.	Theater	-11	-04	-17	-12	03	-02	-10	-10	00	05	19	10	00
49.	Dance	13	01	07	13	15	06	14	-15	09	-10	-10	02	00
50.	Creative Writing	-06	09	07	17	04	02	09	00	00	00	00	00	00
51.	Speech	-06	07	-03	05	-02	00	02	-08	00	00	00	00	00
52.	Music (Instrument)	02	-04	10	00	-06	-11	-02	40	-28	-07	-30	-02	00
53.	Music (Voice)	-03	02	04	02	08	03	03	00	34	21	19	-02	00
	School													
54.	Art School A	09	07	07	08	07	-03	03	33	00	00	00	00	00
55.	High School A	16	-04	07	-04	-19	-03	-03	-36	00	00	00	00	00
56.	High School B	-11	-02	-08	10	02	00	02	00	00	00	00	00	00
57.	Art School B	02	00	-07	-14	14	07	-02	06	00	00	00	00	00
	Grade Point Average (GPA)													
58.	Major Art Area Mean	33	31	39	39	31	32	47	24	37	37	38	20	38
59.	Minor Art Area Mean	14	25	-05	27	21	30	28	-17	18	03	-07	-24	39
60.	Maj.-Min. Art Area Comb. Mean	33	31	38	39	30	33	46	17	41	34	37	16	44
61.	Academic Mean	18	28	21	30	24	12	32	13	11	12	02	00	04
	Control Scores													
62.	Experience BI #14	01	12	06	17	17	05	15	36	10	28	11	21	15
63.	Age	04	13	08	11	12	19	16	05	23	-09	10	-23	09
64.	Grade	07	18	08	12	19	28	20	17	33	-02	20	-17	13
65.	Sex	-10	10	06	04	-07	00	03	01	17	06	24	10	30

7

ed)

45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
--																			
-04	--																		
00	00	--																	
00	00	-20	--																
00	00	-23	-16	--															
00	00	-09	-06	-07	--														
00	00	-07	-05	-05	-02	--													
00	00	-37	-26	-29	-11	-09	--												
00	00	-21	-15	-17	-07	-05	-28	--											
00	00	-18	-04	-09	-04	-05	33	-06	--										
00	00	28	-02	03	23	20	-21	-25	-31	--									
00	00	05	00	16	-09	-06	-11	-02	-27	-30	--								
00	00	-17	05	-10	-12	-09	04	30	-35	-41	-35	--							
38	06	-28	-08	09	-09	02	20	15	00	-08	08	00	--						
39	-11	13	15	-14	12	-06	-10	-08	-31	25	16	00	26	--					
44	13	-25	-05	07	-08	00	17	13	-09	-02	11	00	98	79	--				
04	-15	-12	-18	00	02	10	21	-05	18	-15	-02	00	37	22	35	--			
15	03	-26	-17	06	-05	00	33	-02	18	-22	04	01	27	13	23	20	--		
09	08	09	-04	-07	17	06	-08	00	-04	09	09	-13	00	18	03	-04	05	--	
13	09	-04	-09	-13	10	-01	00	22	-09	-10	-07	24	06	25	09	-02	11	74	--
30	13	05	01	-33	-05	12	17	03	01	03	-13	08	-05	16	-03	04	-13	00	02

SAMPLE SIZES FOR CORRE
CONTROL SCORES

No.	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Ratings														
1.	Sensitivity Rating	342				.					.				
2.	Motivation Rating	342	356			.					.				
3.	Expression of Self Rating	341	341	341		.					.				
4.	Potential Rating	320	320	319	320	.					.				
						.					.				
	Music Checklist					.					.				
						.					.				
5.	#1 Ability to Improvise	104	104	104	104	125					.				
6.	#2 Sense of Pitch	123	123	123	123	121	144				.				
7.	#3 Sense of Rhythm	126	126	126	126	123	143	147			.				
8.	#4 Ability to Sight Read	127	127	127	127	124	144	147	148		.				
9.	#5 Natural Vocal Quality	76	76	76	76	86	97	96	97	97	.				
10.	#6 Compose	80	80	80	80	99	101	100	101	78	101				
11.	Music Checklist Mean	128	128	128	128	125	144	147	148	97	101	149			
	Visual Arts Checklist														
12.	#1 Aesthetic Quality	88	102	88	87	0	0	0	0	0	0	0	102		
13.	#2 Understanding of Self	70	84	70	69	0	0	0	0	0	0	0	84	84	
14.	#3 Clear Image of Projects	87	101	87	86	0	0	0	0	0	0	0	101	83	101
15.	#4 Creative Imagination	88	102	88	87	0	0	0	0	0	0	0	102	84	101
16.	#5 Involvement and Persistence	88	102	88	87	0	0	0	0	0	0	0	102	84	101
17.	#6 Use of Different Types-Media	70	83	70	69	0	0	0	0	0	0	0	83	83	82
18.	Visual Arts Checklist Mean	88	102	88	87	0	0	0	0	0	0	0	102	84	101
	Dance Checklist														
19.	#1 Adapt to Music	52	52	52	38	0	0	0	0	0	0	0	0	0	0
20.	#2 Awareness of Space	52	52	52	38	0	0	0	0	0	0	0	0	0	0
21.	#3 Expression Through Movement	52	52	52	38	0	0	0	0	0	0	0	0	0	0
22.	#4 Body Structure	52	52	52	38	0	0	0	0	0	0	0	0	0	0
23.	#5 Composition and Arrangement	52	52	52	38	0	0	0	0	0	0	0	0	0	0
24.	#6 Self Discipline	52	52	52	38	0	0	0	0	0	0	0	0	0	0
25.	Dance Checklist Mean	52	52	52	38	0	0	0	0	0	0	0	0	0	0
	Theater Checklist														
26.	#1 Theatrical Talent	54	54	54	54	0	0	0	0	0	0	0	0	0	0
27.	#2 Perform Different Roles	54	54	54	54	0	0	0	0	0	0	0	0	0	0
28.	#3 Improvise	54	54	54	54	0	0	0	0	0	0	0	0	0	0
29.	#4 Make Part Believable	54	54	54	54	0	0	0	0	0	0	0	0	0	0
30.	#5 Communicate with Audience	54	54	54	54	0	0	0	0	0	0	0	0	0	0
31.	#6 Understanding of Self	54	54	54	54	0	0	0	0	0	0	0	0	0	0
32.	Theater Checklist Mean	54	54	54	54	0	0	0	0	0	0	0	0	0	0

Table 8

FOR CORRELATIONS BETWEEN CRITERION AND
ROL SCORES FOR THE ART SAMPLE

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
84																			
83	101																		
84	101	102																	
84	101	102	102																
83	82	83	83	83															
84	101	102	102	83	102														
0	0	0	0	0	0	52													
0	0	0	0	0	0	52	52												
0	0	0	0	0	0	52	52	52											
0	0	0	0	0	0	52	52	52	52										
0	0	0	0	0	0	52	52	52	52	52									
0	0	0	0	0	0	52	52	52	52	52	52								
0	0	0	0	0	0	52	52	52	52	52	52	52							
0	0	0	0	0	0	0	0	0	0	0	0	0	54						
0	0	0	0	0	0	0	0	0	0	0	0	0	54	54					
0	0	0	0	0	0	0	0	0	0	0	0	0	54	54	54				
0	0	0	0	0	0	0	0	0	0	0	0	0	54	54	54	54			
0	0	0	0	0	0	0	0	0	0	0	0	0	54	54	54	54	54		
0	0	0	0	0	0	0	0	0	0	0	0	0	54	54	54	54	54	54	
0	0	0	0	0	0	0	0	0	0	0	0	0	54	54	54	54	54	54	54

Table 8

(continue

No.	Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Overall Checklist														
33.	#1 Likeability	342	355	341	320	125	144	147	148	97	101	149	101	83	100
34.	#2 Creativity	342	356	341	320	125	144	147	148	97	101	149	102	84	101
35.	#3 Creativity	339	353	338	317	122	144	144	145	97	101	146	102	84	101
36.	#4 Leadership	329	343	328	307	116	135	135	136	96	101	137	102	84	101
37.	#5 Stimulation Value	331	345	330	309	116	135	135	136	95	100	137	102	84	101
38.	#6 Creativity	325	339	324	317	122	144	144	145	97	101	146	102	84	101
39.	Creativity Mean (34, 35,38)	342	356	341	320	125	144	147	148	97	101	149	102	84	101
40.	Self Report Number of Awards	229	243	228	222	75	94	98	98	54	56	99	68	50	67
41.	Peer Nom:Tech.Compt.-Any Lv.	42	42	42	42	25	35	36	36	23	20	36	3	3	3
42.	Tech.Compt.-Own Lvl	42	42	42	42	25	35	36	36	23	20	36	3	3	3
43.	Personal Style-Any Lvl.	42	42	42	42	25	35	36	36	23	20	36	3	3	3
44.	Personal Style-Own Lvl.	42	42	42	42	25	35	36	36	23	20	36	3	3	3
45.	Chairs	37	37	37	37	24	36	37	37	19	13	37	0	0	0
46.	Major vs. Minor	84	84	84	83	48	68	72	72	42	31	72	5	5	5
	Area of Arts														
47.	Visual Arts	317	331	317	295	113	125	124	125	87	95	126	102	84	101
48.	Theater	317	331	317	295	113	125	124	125	87	95	126	102	84	101
49.	Dance	317	331	317	295	113	125	124	125	87	95	126	102	84	101
50.	Creative Writing	317	331	317	295	113	125	124	125	87	95	126	102	84	101
51.	Speech	317	331	317	295	113	125	124	125	87	95	126	102	84	101
52.	Music (Instrument)	317	331	317	295	113	125	124	125	87	95	126	102	84	101
53.	Music (Voice)	317	331	317	295	113	125	124	125	87	95	126	102	84	101
	School														
54.	Art School A	342	356	341	320	125	144	147	148	97	101	149	102	84	101
55.	High School A	342	356	341	320	125	144	147	148	97	101	149	102	84	101
56.	High School B	342	356	341	320	125	144	147	148	97	101	149	102	84	101
57.	Art School B	342	356	341	320	125	144	147	148	97	101	149	102	84	101
	Grade Point Average (GPA)														
58.	Major Art Area Mean	234	247	233	215	86	99	98	99	64	75	100	80	80	79
59.	Minor Art Area Mean	69	69	69	67	33	43	46	46	28	25	46	10	10	10
60.	Maj.-Min. Art Area Comb. Mean	254	267	253	235	98	114	116	117	71	81	118	80	80	79
61.	Academic Mean	255	268	254	236	98	114	116	117	71	81	118	80	80	79
	Control Scores														
62.	Experience BI #14	342	356	341	320	125	144	147	148	97	101	149	102	84	101
63.	Age	339	353	338	318	123	142	145	146	96	100	147	102	84	101
64.	Grade	331	345	330	310	123	142	145	146	96	99	147	97	80	96
65.	Sex	341	355	340	319	125	143	146	147	97	101	148	102	84	101

Table 8

(continued)

13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
83	100	101	101	83	101	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	51	51	51	51	51	51	51	54	54	54	54	54	54	54
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	38	38	38	38	38	38	38	54	54	54	54	54	54	54
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
80	67	68	68	49	68	25	25	25	25	25	25	25	34	34	34	34	34	34	34
3	3	3	3	3	3	0	0	0	0	0	0	0	2	2	2	2	2	2	2
3	3	3	3	3	3	0	0	0	0	0	0	0	2	2	2	2	2	2	2
3	3	3	3	3	3	0	0	0	0	0	0	0	2	2	2	2	2	2	2
3	3	3	3	3	3	0	0	0	0	0	0	0	2	2	2	2	2	2	2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	5	5	5	5	0	0	0	0	0	0	0	5	5	5	5	5	5	5
84	101	102	102	83	102	52	52	52	52	52	52	52	53	53	53	53	53	53	53
84	101	102	102	83	102	52	52	52	52	52	52	52	53	53	53	53	53	53	53
84	101	102	102	83	102	52	52	52	52	52	52	52	53	53	53	53	53	53	53
84	101	102	102	83	102	52	52	52	52	52	52	52	53	53	53	53	53	53	53
84	101	102	102	83	102	52	52	52	52	52	52	52	53	53	53	53	53	53	53
84	101	102	102	83	102	52	52	52	52	52	52	52	53	53	53	53	53	53	53
84	101	102	102	83	102	52	52	52	52	52	52	52	53	53	53	53	53	53	53
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
80	79	80	80	79	80	44	44	44	44	44	44	44	26	26	26	26	26	26	26
80	10	10	10	10	10	5	5	5	5	5	5	5	9	9	9	9	9	9	9
80	79	80	80	79	80	45	45	45	45	45	45	45	27	27	27	27	27	27	27
80	79	80	80	79	80	45	45	45	45	45	45	45	27	27	27	27	27	27	27
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54
84	101	102	102	83	102	51	51	51	51	51	51	51	54	54	54	54	54	54	54
80	96	97	97	79	97	50	50	50	50	50	50	50	52	52	52	52	52	52	52
84	101	102	102	83	102	52	52	52	52	52	52	52	54	54	54	54	54	54	54

Table 8

(continued

No.	Description	33	34	35	36	37	38	39	40	41	42	43	44	45
	Overall Checklist													
33.	#1 Likeability	376				·					·			
34.	#2 Creativity	376	377			·					·			
35.	#3 Creativity	373	374	374		·					·			
36.	#4 Leadership	363	364	364	364	·					·			
37.	#5 Stimulation Value	364	365	365	363	365					·			
38.	#6 Creativity	359	360	360	350	351	360				·			
39.	Creativity Mean (34,35,38)	376	377	374	364	365	360	377			·			
											·			
40.	Self Report Number of Awards	242	243	240	233	234	240	243	344		·			
41.	Peer Nom:Tech.Compt.-Any Lvl.	42	42	41	39	39	41	42	41	52	·			
42.	Tech.Compt.-Own Lvl.	42	42	41	39	39	41	42	41	52	52			
43.	Personal Style-Any Lvl.	42	42	41	39	39	41	42	41	52	52	52		
44.	Personal Style-Own Lvl.	42	42	41	39	39	41	42	41	52	52	52	52	
45.	Chairs	37	37	36	35	36	36	37	41	26	26	26	26	49
46.	Major vs. Minor	84	84	81	72	73	81	84	83	52	52	52	52	49
	Area of Arts													
47.	Visual Arts	351	352	352	347	348	338	352	317	43	43	43	43	40
48.	Theater	351	352	352	347	348	338	352	317	43	43	43	43	40
49.	Dance	351	352	352	347	348	338	352	317	43	43	43	43	40
50.	Creative Writing	351	352	352	347	348	338	352	317	43	43	43	43	40
51.	Speech	351	352	352	347	348	338	352	317	43	43	43	43	40
52.	Music (Instrument)	351	352	352	347	348	338	352	317	43	43	43	43	40
53.	Music (Voice)	351	352	352	347	348	338	352	317	43	43	43	43	40
	School													
54.	Art School A	376	377	374	364	365	360	377	344	52	52	52	52	49
55.	High School A	376	377	374	364	365	360	377	344	52	52	52	52	49
56.	High School B	376	377	374	364	365	360	377	344	52	52	52	52	49
57.	Art School B	376	377	374	364	365	360	377	344	52	52	52	52	49
	Grade Point Average (GPA)													
58.	Major Art Area Mean	266	267	267	263	264	256	267	165	45	45	45	45	40
59.	Minor Art Area Mean	74	74	72	65	66	71	74	49	24	24	24	24	18
60.	Maj.-Min. Art Area Comb. Mean	286	287	285	275	276	274	287	184	51	51	51	51	45
61.	Academic Mean	287	288	286	276	277	275	288	185	51	51	51	51	44
	Control Scores													
62.	Experience BI #14	376	377	374	364	365	360	377	344	52	52	52	52	49
63.	Age	373	374	371	362	363	358	374	343	52	52	52	52	49
64.	Grade	364	365	362	352	353	349	365	337	52	52	52	52	49
65.	Sex	375	376	373	363	364	359	376	343	52	52	52	52	48

8

nued)

45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	6
49																				
49	105																			
40	75	459																		
40	75	459	459																	
40	75	459	459	459																
40	75	459	459	459	459															
40	75	459	459	459	459	459														
40	75	459	459	459	459	459	459													
40	75	459	459	459	459	459	459	459												
49	105	459	459	459	459	459	459	459	501											
49	105	459	459	459	459	459	459	459	501	501										
49	105	459	459	459	459	459	459	459	501	501	501									
49	105	459	459	459	459	459	459	459	501	501	501	501								
40	73	277	277	277	277	277	277	277	287	287	287	287	287							
18	52	58	58	58	58	58	58	58	84	84	84	84	57	84						
45	98	281	281	281	281	281	281	281	314	314	314	314	287	84	314					
44	98	282	282	282	282	282	282	282	315	315	315	315	287	83	313	315				
49	105	459	459	459	459	459	459	459	501	501	501	501	287	84	314	315	501			
49	103	457	457	457	457	457	457	457	497	497	497	497	285	81	310	311	497	497		
49	105	447	447	447	447	447	447	447	488	488	488	488	279	83	306	307	488	485	488	
48	104	458	458	458	458	458	458	458	500	500	500	500	287	84	314	315	500	496	487	50

versus minor criteria (variables 41 through 46). However, some of these correlations were below the .05 significance level (approximately .30 for peer nominations and chairs and .21 for major versus minor), which may have reflected low variability in the later measures due to small sample sizes (Art School A only).

The rating scales were, with few exceptions, not significantly correlated with the area of art specialization measures (variables 47 through 53) and the school measures (variables 54 through 57). Those correlations that were significant were only of borderline significance, and did not establish a meaningful pattern of relationships. The correlations between the ratings and GPA in major or main art area (variable 58) and GPA in major and minor art areas (variable 60) varied between .36 and .60, indicating a moderate to high degree of relationship. This was to be expected as the faculty in the arts provided both sets of measures. However, the correlations between the ratings and academic GPA (variable 61) were considerably less than those with GPA in the arts, indicating different types of abilities inherent in performing in the two areas.

The correlations between the ratings and the control variables (62 through 65) were with one exception very low (.00 to .20), the exception being a still relatively low .27 between grade and the potential rating. On the basis of these low correlations and the low correlations between the ratings and likeability, no correction was made in the ratings for effects of control variables.

The same general pattern of relationships existed between the checklist items, particularly the checklist means, and the self-report, peer nomination, chair, major versus minor, art areas, school, GPA variables, and control scores, as existed between the ratings and these variables. Although some correlations differed from those between the ratings and the later criterion measures and control scores, these divergencies were generally small and, therefore, since little could be added by discussing these correlations, the presentation of the checklist relationships will generally be concentrated on the intercorrelations within each particular set of checklist items.

The intercorrelations between the items in the music checklist (variables 5 through 10) varied between .19 and .60. All correlations were significant at the .05 level, or lower, although some were of borderline significance. The generally moderate intercorrelations among the items did not offer much support for the hypothesis provided in the review section of this report that the different abilities measured by the items were independent. A conclusion concerning independence or the lack of such, however, should be the subject of further research where different and more numerous sources of measurement for each dimension measured by the checklist items are employed. The lack of high intercorrelations between the items, even with the effects of halo, indicates this could be a fruitful area of research.

A point of interest was the high correlations between the potential rating and sense of rhythm (.64) and ability to sight read (.68), indicating these two items were most significant in the potential rating on music students. All of the music checklist items correlated above .56,

four of the six correlations were in the .70's, with the music checklist mean score (variable 11), which further demonstrated homogeneity of measurement for the set of checklist items. The correlations between the music checklist mean score and the self-report, peer nomination, etc., data were very similar to those between the ratings and these later variables, which reflected the high correlations between the mean checklist score and the ratings.

The intercorrelations among the art checklist items (variables 12 through 17) demonstrated more homogeneity than was found between the music checklist items. The correlations varied from .44 to .74 ($p<.05$). The aesthetic quality item (variable 12) and the creative imagination item (variable 15) correlated .71, a result that failed to substantiate Beittel's (1964) and Kincaid's (1964) contentions that aesthetic quality and creativity should be measured separately. However, Burkhart's (1964) spontaneous-deliberate continuum and Barkan and Hausman's (1956) concept bound-percept bound continuum received support in that the creative imagination item had only a moderate (.46) correlation with the initial clear image of project item (variable 14). Considering the spurious effect of source variance on the correlations, the above relationship indicated initial clear image of project (measuring deliberatness) and creative imagination (measuring spontaneity) were not highly related.

The patterns of correlations between the ratings and the art checklist items did provide some supportive evidence for the theories presented by Beittel, Kincaid and Burkhart, although the evidence was not strong. The expression of self rating, the most germane rating for the creativity process, correlated most highly (.85) with the creative imagination item, although the correlation between this rating and the aesthetic quality item was .78. The importance of spontaneity was indicated by the before mentioned correlation of .85 between the expression of self rating and the creative imagination item versus the comparatively lower correlation of .53 between the initial clear image and the expression of self rating. Further evidence of the importance of aesthetic quality and creative imagination in the visual arts was provided by the correlations of .70 and .78 between the checklist items measuring these criteria and the potential rating (variable 4). These correlations were the highest relationships of all visual art checklist items with the potential rating.

The visual art checklist items correlated between .72 and .90 with the visual art checklist item mean (variable 18), which demonstrated substantial homogeneity of measurement. The visual art checklist mean had correlations with the remaining criteria similar to those of the rating scales, with the following exceptions. The visual art checklist mean was more highly related to likeability (.51), creativity checklist mean (.83) and academic GPA (.54), than were the ratings. Correlations between the visual arts checklist mean and peer nominations and major versus minor were disregarded due to the small sample sizes. Finally, the visual art checklist mean was not significantly correlated with the last four control variables.

The dance checklist items (variables 19 through 24) were highly interrelated as the correlations varied between .54 and .77 ($p < .05$). Little information could be obtained from patterns of intercorrelations between the checklist items, although the item on body structure (variable 22) had the lowest pattern of intercorrelations with the other items. The correlations between the dance checklist items and the ratings did provide more information on differential relationships and partially supported the presence of construct validity for the ratings and items. For example, the sensitivity and expression of self rating scales correlated more substantially with the desire for composition and arrangement item (variable 23), .74 and .73 respectively, than with any other dance checklist item. The checklist item correlating most highly with the potential rating was the self discipline item (.65).

The dance checklist items were substantially correlated with the dance checklist mean (variable 25), as correlations varied between .78 and .90. The dance checklist mean was somewhat more highly related to likeability (.35) than were the ratings. The opposite was true for the correlation between the checklist mean and number of awards (-.03), although the N was only 25. The relationships between the dance checklist mean, peer nominations and major versus minor were disregarded due to small or no N's. Finally, the dance checklist mean correlated .38 with experience, which though moderate was higher than the correlations between experience and the ratings.

The theater checklist items (variables 26 through 31) continued to demonstrate a high degree of homogeneity of relationship, with the exception of the theatrical talent item (variable 26). Intercorrelations among checklist item measures 27 through 31 varied from a low of .40 to a high of .70; while the theatrical talent item had intercorrelations between .08 and .46 with the other checklist items. The low and nonconsistant intercorrelations between theatrical talent and the other theater checklist items was rather surprising, especially in view of the correlation of only .15 between the potential rating and this particular item. Further analyses of the relationships of the theatrical talent item demonstrated that this item had a significant negative correlation (-.44) with grade in major area (variable 58). On the basis of this information, it was concluded that this particular item was too inconsistant with other consistant relationships, and the item was disregarded.

The intercorrelations among the remaining theater checklist items indicated that the understanding of self item (variable 31) had the lowest pattern of intercorrelations with the other checklist items, although all correlations were significant ($p < .05$). These results provided only partial support to the hypothesis that a student must know and understand himself before he or she can characterize roles. Further information was gained from the correlations between ability to portray different roles (variable 27) and ability to improvise (.70), and the correlation between ability to concentrate and make a part believable (.60). While both correlations were high, it was interesting that ability to portray different roles had a more substantial relationship with the more spontaneous improvization abilities than the more concentrated and practiced performance required in making a part believable. However, the

importance of concentration and making a part believable was evidenced by the high correlations between this item and the sensitivity and motivation ratings, .75 and .80 respectively. These correlations represented the highest relationships with these two ratings for the theater checklist. Both the ability to improvise and the communicate with the audience items correlated most highly with the expression of self rating which provided further support to the construct validity of the expression of self rating.

The correlations between the theater checklist mean (variable 32) and the theater checklist items, with the exception of the theatrical talent item, varied from .74 to .89, which maintained the homogeneity of variance found in the previous checklists. The theater checklist mean had correlations with the remaining criterion variables that differed somewhat from those with the ratings, although the pattern and direction of the correlations were the same as those of the ratings. The theater checklist mean correlated .75 with the creativity checklist mean (variable 39), which was only somewhat higher than the correlations between the ratings and this creativity measure. However, the theater checklist mean correlated .53 with GPA in main area of artistic interest (variable 58) and .60 with GPA in major and minor areas (variable 60). These correlations were substantially higher than those between the ratings and the GPA measures, perhaps reflecting smaller sample sizes. Finally, the theater checklist mean had lower correlations with the control scores, including likeability (.17) and experience (.04), than did the ratings with these control measures.

In the overall checklist, the criterion items (variables 34 through 38) evidenced moderate to high intercorrelations. The three creativity items (variables 34, 35 and 38) intercorrelated moderately and all of these items correlated highly with the creativity checklist mean (variable 39), which was based upon a mean of these three items. Interestingly, the three creativity checklist items generally correlated at higher levels with the leadership item (variable 36) than they did among themselves. Also, the leadership checklist item had the highest correlation with the creativity checklist (.86) of any of the overall checklist criterion items. On the other hand, the stimulation value checklist item (variable 37) had a relatively flat distribution of moderate correlations with the creativity items and the leadership item. On the basis of these relationships, it appeared that creative students were also the leaders in the artistic areas, at least in the classrooms, studios, rehearsal halls, etc., where an instructor was present. Since the leadership item measured frequency of initiating activities, it appeared reasonable to assume that the most creative students were the initiators of activities. However, the assumption that the more creative students were initiators of activities for other students did not mean that they became highly involved in the activities of other students, as evidenced by the moderate correlations between the stimulation value item and the creativity and leadership items.

The correlations between the creativity checklist items and the rating criteria reflected the importance of the creativity items and the leadership item as a rather flat distribution of high correlations was obtained. The stimulation value item had a rather flat distribution of

moderate correlations with the ratings, again indicating the relative lesser degree of importance placed on this ability.

The correlations between the main creativity checklist criteria, i.e., the creativity checklist mean, the leadership item and the stimulation value item and, chairs, the art area variables, the school variables, the GPA variables and the control variables were generally the same as those of the ratings with these variables. However, the creativity checklist criteria had lower correlations with number of awards, peer nominations and major versus minor in comparison to the ratings. The stimulation value checklist item had a pattern of negative but low and generally nonsignificant correlations with peer nominations, chairs, and major versus minor. The relative unimportance of stimulation value was especially apparent in the pattern of low negative correlations between this variable and the peer nomination information. Although it was not possible to generalize beyond these correlations due to the small sample size for peer nominations, a good indication was provided that students agreed with instructors on the relative unimportance of stimulation value. This in turn indicated the strong need for and importance placed on individual performance in the arts.

The self-report measure of number of awards (variable 40) generally had low and nonsignificant correlations with the peer nomination measures (variables 41 through 44), and a significant relationship (.41) with chairs (variable 45). Number of awards and major versus minor (variable 46) correlated only .09 (N=83), which demonstrated that the major versus minor determination was not related to number of awards. The correlations between number of awards and the art area and school variables provided a strong indication that music (instrument) students had a higher mean number of awards than did students in other areas of the arts. This was evidenced by the significant .40 (N=317) correlation between number of awards and the music (instrument) art area variable (variable 52). On this basis, the self-report number of awards variable was standardized by art areas, i.e., standard scores for each art area were computed, prior to the item analysis, to control for possible contamination of number of awards by differential opportunities across art areas.

The number of awards criterion had low correlations with both GPA in the arts and academics. This again reflected the lack of importance given to number of awards, as previously seen in the relationships between awards, the ratings and major versus minor. Number of awards correlated .00 with the likeability control measure (variable 33), and very lowly with all other control measures except experience (.36).

The peer nomination measures (variables 41 through 44) were moderately to highly intercorrelated. Nominations on the same dimension, either technical competence or personal style, were generally less highly intercorrelated than were nominations on the same level across dimensions. For example, technical competence--any class level correlated .58 (N=52) with technical competence--own class level, .68 (N=52) with personal style--any class level, and .30 (N=52) with personal style--own class level. The two peer nomination variables for technical

competence were highly related to the chairs criterion, however, the personal style peer nominations were not significantly related to the chair criterion. Since the N was only 26 for these correlations, little could be generalized from these relationships.

The peer nomination measures generally failed to have significant correlations with the major versus minor variable and the art area variables, although a partial pattern of correlations provided some evidence that music (voice) students had more nominations than students in other art areas and music (instrument) students had fewer nominations. The correlations between peer nominations and the school variables were all .00 since peer nominations were only available from one school. Major GPA and the major and minor mean GPA measures (variables 58 and 60) were moderately correlated with peer nominations, which revealed some agreement between students and teachers on competence in the arts. Finally, the peer nomination variables generally were not significantly related to the control variables.

The chairs criterion (variable 45, N=49) was not significantly correlated with major versus minor (-.04), which was surprising. However, this was most likely attributable to the restricted range for individual students on whom the two measures were available. The correlations between chairs and the art area and school variables were all .00 because the chairs criterion was available for only music (instrument) students at one art school. The chairs criterion correlated moderately with the art GPA measures (variables 58 through 60), but not with academic GPA (variable 61). This was consistant with previous results, and demonstrated homogeneity of measurement across criterion measures provided, or determined, by the artistic instructors. Finally, the chairs criterion was not significantly related to the control variables, with the exception of sex (variable 65), where the correlation was of borderline significance (.30, N=48).

The major versus minor measure (variable 46, N=105) was also available for students at one art school only. This criterion was generally not significantly correlated with any of the remaining measures, including the GPA criteria and the control measures. The nonsignificant correlation between major versus minor and grade in school or class level (variable 64) was especially enlightening as this meant majors in art areas were distributed throughout the grade levels and not just in the upper levels (junior and senior).

The art GPA measures (variables 58 through 60) and the academic GPA measure (variable 61) were generally not significantly correlated with the art area variables. Exceptions were found for the visual art area measure (variable 47), which correlated -.28 ($p < .05$) with GPA in major and -.25 ($p < .05$) with GPA in combined major and minor areas. These results indicated visual art departments had a tendency to provide lower grades than other areas of the arts. Low, but significant positive correlations were also found between music (instrument) and music (voice) art areas and GPA in major art areas. These results indicated students in music received somewhat higher grades than students in other art areas. Secondly, music (instrument) correlated .21 ($p < .05$) with academic GPA,

which indicated students in instrumental music tended to have higher grades than students in other art areas.

The correlations between the GPA variables, both art and academic, and the school variables were generally low and nonsignificant. A small indication existed that the Art School A students had an academic GPA higher than High School A students, but the indication was quite weak. Secondly, the Art School A students in minor areas had minor GPA's lower than those for High School A, although again the correlations were only moderate, and based on a sample size of 84. The two art GPA criteria with GPA in major as a member (variables 58 and 60) correlated significantly, but moderately, with likeability (.33 in both cases). The art and academic GPA measures also generally had low but significant correlations with experience. However, these correlations were not high enough to justify correction. The remaining correlations between GPA and the control variables were generally not significant.

The correlations between the art area measures (variables 47 through 53) and the school variables (variables 54 through 57) were based on an N of 459, and indicated the extent to which any one school contributed more students in a particular art area than the other three schools. These correlations were generally either nonsignificant or low. This demonstrated that no one school contributed predominantly to any one particular art area. The correlations between the art area variables and the control measures provided the information that visual art students tended to have less experience than students in other art areas (-.26), music students had a tendency to have more experience (.33), and there were more females in dance than in other art areas (-.33). These correlations were relatively low and did not warrant correction.

The final topic to be presented in the discussion of the criterion and control score correlations matrix is the set of correlations between the school measures and the control variables. Due to the low and nonsignificant correlations between these variables, the only information provided was that the students in High School A tended to have less experience in the arts than students in the other schools (-.22), while Art School A students tended to have more experience (.18). Secondly, the students at Art School B tended to have a higher mean grade level than students from other schools (.24).

The investigators had originally planned to conduct a factor analysis of the criterion data following the criterion and control score correlation analysis. However, due to the disproportions in sample sizes for many of the criterion variables, it was decided to delete the factor analysis because of the effects different degrees of sampling error would have on the factor loadings, i.e., unstable and nongeneralizable factor loadings. For this reason, a more comprehensive treatment was given to the presentation of the criterion and control score matrix than would have been given if a factor analysis had been conducted. This was based upon the rationale that a more comprehensive presentation covering all criterion measures would be more beneficial to the understanding of the multiple criteria than either an unstable factor analysis, or a factor analysis based upon a vastly reduced subset of the multiple

criteria which had sufficient N's to enter into this type of statistical analysis.

Three criterion composites were constructed prior to the item analysis of the art sample. The composites were based upon separate combinations of three of the rating scales, motivation, expression of self and potential, and the corrected measure for self report number of awards. Each of the above rating scales was combined with number of awards to obtain three separate criterion composites. All variables entering into the composites were standardized prior to the construction of the composite. As previously presented, the composites were developed on the rationale that a combination of criteria, each of which assessed a relevant aspect of performance, would result in a more predictable, comprehensive, and reliable criterion. No attempt was made to develop a multi-factor overall composite; but rather, the rating and award criteria were combined in order to more adequately encompass and assess several relevant aspects of performance.

Item Analysis Results for the BI Items on the Art Sample

According to the format presented in the procedure section of this report, the art sample was randomly divided into two separate subsamples. The first subsample included 250 subjects and the second subsample included 251 subjects. A double cross validation item analysis was carried out in which keys were developed empirically to predict selected criteria in each cross validation run. The cross validated keyscores were then merged with the criterion scores and cross validities were computed on the total art sample for the two BI sections of the BI, the climate section of the BI, and total BI (all BI items). By using this procedure, it was possible to emphasize the stability in the data; however, cross validities for any one particular criterion were either higher or lower in each of the separate cross validation runs. Also included in this analysis were the two a priori BI keys developed from previous research. These two keys included the IBRIC Creativity Key and the Academic Performance Key. The effectiveness of these a priori keys will be compared to the effectiveness of the empirically developed and cross validated keys in the following discussion.

The criterion and control scores entering into the item analysis of the BI items for the art sample are presented in Table 9. A total of 36 out of the possible 65 criterion and control scores were selected for the item analysis of the art sample. The selection of criterion and control variables was based upon relevance, homogeneity with variables not selected for inclusion in the item analysis, and comparatively fewer cases of missing data. In addition, the three composite criteria entered into the item analysis as additional performance criteria. The criterion and control scores were rearranged in Table 9 so that all performance criteria were included within variables 1 through 24. Finally, the sample size for each criterion and control score is presented.

Scoring keys were developed on the BI items to predict five of the 24 performance criteria. These criteria were: (1) the sensitivity

Table 9

CRITERION AND CONTROL SCORES FOR ITEM ANALYSIS OF THE ART SAMPLE

No.	Description	Sample Size
1.	Sensitivity Rating	342
2.	Motivation Rating	356
3.	Expression of Self Rating	341
4.	Potential Rating	320
5.	Music Chklst. Item #6-Ability to Compose	101
6.	Music Chklst. Mean	149
7.	Visual Art Chklst. Item #1-Aesthetic Quality	102
8.	Visual Art Chklst. Item #3-Clear Image of Products	101
9.	Visual Art Chklst. Item #4-Creative Imagination	102
10.	Visual Art Chklst. Mean	102
11.	Dance Chklst. Item #5-Composition and Arrangement	52
12.	Dance Chklst. Mean	52
13.	Theater Chklst. Item #4-Concentrate - Make Part Relievable	54
14.	Theater Chklst. Mean	54
15.	Creativity Chklst. Mean	377
16.	Peer Nominations: Technical Competence - Any Level	52
17.	Peer Nominations: Personal Style - Any Level	52
18.	Major Art Area GPA	287
19.	Major and Minor Art Areas GPA	314
20.	Academic GPA	315
21.	Number of Awards - Corrected	317
22.	Motivation Rating + Number of Awards	220
23.	Expression of Self Rating + Number of Awards	206
24.	Potential Rating + Number of Awards	199
25.	Visual Arts Major	459
26.	Theater Major	459
27.	Dance Major	459
28.	Creative Writing Major	459
29.	Speech Major	459
30.	Music (Instrument) Major	459
31.	Music (Voice) Major	459
32.	Art School A	501
33.	High School A	501
34.	High School B	501
35.	Art School B	501
36.	Overall Chklst. #1 Likeability	376
37.	Experience	501
38.	Grade Level	488
39.	Sex	500

rating, (2) the motivation rating, (3) the potential rating, (4) the creativity checklist mean, and (5) combined major and minor GPA in the arts. The means and standard deviations for these BI scoring keys are presented in Table 10. Within this table, the BI scoring keys (or simply, BI keys) are presented in terms of the sections of the BI on which the keys were constructed. Keys constructed empirically to predict the above five criteria on BI items 1-199 plus item 218 (general BI items) have been designated by an "I" following the key number.[6] Keys based on items 252 through 300 (art BI items) have a "II" following the key number. The BI keys based on all BI items, a composite of the above two keys, have key numbers followed by a "T". Three additional BI keys also appear in Table 10, namely keys designated 6I, 1A and 2A. The BI key designated 6I was the key empirically constructed in the second item analysis, to be presented later in the chapter, to predict the art versus non-art criterion on the combined art and non-art SF samples. This key was based upon only BI items 1 through 199, and was included in the item analysis of the art sample to ascertain its validity against the art performance criteria. The BI keys designated 1A and 2A represented the two a priori BI keys developed in previous research.

In Table 10, the means for the empirically developed and cross validated BI keys (1I through 16T) were all above 100.0. The range extended from 100.87 to 112.39. In the development of the keys, the number of negatively scored items were subtracted from the number of positively scored items for each person, and a constant of 100 added. The number of mean keyscores above 100 indicated that the number of positively scored item alternatives was comparatively larger than the number of negatively scored item alternatives, which in turn reflected the slight skew in most of the criterion data. The standard deviations were quite large compared to those typically obtained in prior research, displaying a comparatively large amount of variance for the keyscores obtained in this study. This was an encouraging result as typically variance in the keyscores is a prerequisite to obtaining significant cross validities for the keys against the criteria.

Table 11 presents the total sample cross validation matrix for the art sample. The rows represent the 39 criterion and control scores and the columns represent the BI keys presented in Table 10. The cross validities for predicting each criterion can be obtained by selecting the desired criterion and reading across the appropriate row. The cross validities for a BI key against all of the criteria presented in this matrix can be ascertained by selecting the key and reading down the appropriate column. For example, the key developed to predict the potential rating on the first 199 BI items plus item 218 (key 3I) predicted that potential rating criterion with a cross validity of .42. The cross validity of .42 represents the intersection of row four and column three. The cross validities for the other BI keys in predicting this same criterion can be obtained by scanning the remaining cross validities in row four. For example, the key developed to predict the creativity checklist mean on BI

---

[6] Item 218 was included with items 1-199 because prior experience in the arts was not required to answer this item.

Table 10

MEANS AND STANDARD DEVIATIONS FOR BI KEYS
ON ITEM ANALYSIS OF THE ART SAMPLE[1]

Key		Mean	S.D.
Items (1-199) + 218	General BI Items		
1I	Sensitivity Rating Key	103.13	11.22
2I	Motivation Rating Key	107.03	12.47
3I	Potential Rating Key	102.86	14.48
4I	Creativity Checklist Key	100.87	9.61
5I	Combined Major and Minor GPA Key	108.58	12.38
6I	Art vs. Non-art Key	106.15	12.87
Items 252-300	Art BI Items		
7II	Sensitivity Rating Key	102.44	6.58
8II	Motivation Rating Key	103.18	8.19
9II	Potential Rating Key	102.79	9.50
10II	Creativity Checklist Key	102.94	6.11
11II	Combined Major and Minor GPA Key	103.81	6.44
All BI Items			
12T	Sensitivity Rating Key	105.57	15.97
13T	Motivation Rating Key	110.21	18.17
14T	Potential Rating Key	105.65	21.65
15T	Creativity Checklist Key	103.81	14.01
16T	Combined Major and Minor GPA Key	112.39	16.32
1A	Academic Performance Key	111.79	17.17
2A	IBRIC Creativity Key	107.91	6.76

[1] The sample size was 501 for all keys.

Table 11

CROSS VALIDITIES AND CORRELATIONS BETWEEN BI KEYS AND CRITERION AND CONTROL SCORES FOR THE ART SAMPLE[1]

	BI KEYS																	
	1I	2I	3I	4I	5I	6I	7II	8II	9II	10II	11II	12T	13T	14T	15T	16T	1A	2A
1.	31	29	30	32	19	24	37	37	35	41	36	37	36	35	39	29	20	21
2.	32	33	28	34	30	22	40	38	37	42	37	39	40	35	41	37	30	20
3.	29	25	29	29	16	24	37	35	34	40	32	35	33	34	37	25	18	22
4.	41	32	42	35	14	35	47	46	47	49	39	48	42	49	46	26	19	28
5.	18	09	20	14	-03	17	29	23	27	25	16	25	17	25	20	05	-07	13
6.	22	21	22	20	13	20	34	28	29	30	28	31	29	28	28	22	00	10
7.	36	35	30	39	21	26	43	46	46	50	37	42	43	40	47	30	30	26
8.	29	41	22	40	39	13	35	42	36	37	41	34	46	30	42	46	42	16
9.	32	24	25	25	10	20	36	33	36	39	30	37	30	32	33	20	26	25
10.	40	41	33	41	30	23	45	45	45	48	41	46	46	41	47	39	42	29
11.	30	38	25	31	33	27	29	33	31	33	34	34	42	32	37	40	02	15
12.	32	39	25	32	32	18	33	34	35	36	33	37	44	33	38	39	06	06
13.	47	38	45	49	41	33	48	39	38	52	32	51	42	46	54	41	41	36
14.	32	17	38	30	20	37	30	23	30	32	17	33	21	38	34	21	17	37
15.	25	26	23	28	23	24	30	29	28	29	31	30	30	28	32	30	20	16
16.	20	05	10	-07	05	01	20	00	09	15	-02	22	03	11	02	03	00	07
17.	34	16	27	08	16	18	28	23	24	29	20	36	22	28	20	19	10	26
18.	27	33	17	31	34	14	36	33	31	35	34	33	37	25	36	39	34	09
19.	23	29	13	26	31	11	35	32	30	34	34	30	34	22	32	37	31	08
20.	33	49	23	41	52	03	09	08	05	10	10	27	37	18	32	43	67	22
21.	32	27	30	34	17	37	38	35	36	35	29	38	35	36	39	24	12	20

18.	27	33	17	31	34	14	36	33	31	35	34	33	37	25	36	39	34	09
19.	23	29	13	26	31	11	35	32	30	34	34	30	34	22	32	37	31	08
20.	33	49	23	41	52	03	09	08	05	10	10	27	37	18	32	43	67	22
21.	32	27	30	34	17	37	38	35	36	35	29	38	35	36	39	24	12	20
22.	47	47	44	47	33	44	51	49	49	50	43	53	53	50	53	42	31	29
23.	43	39	41	41	25	43	48	46	45	47	40	49	47	47	49	35	22	26
24.	50	45	51	46	23	53	54	51	53	51	44	57	53	57	54	35	25	31
25.	-21	-23	-18	-22	-20	-18	-17	-19	-16	-19	-20	-21	-25	-19	-23	-23	-13	-09
26.	13	02	14	06	01	15	08	08	10	08	04	12	05	14	08	02	02	21
27.	-17	-13	-14	-04	-03	-02	-03	00	-04	00	02	-13	-09	-11	-03	-01	-13	-20
28.	-03	-04	-05	01	00	00	01	00	02	-02	02	-02	-03	-03	00	00	-04	02
29.	06	05	01	05	02	-11	01	00	00	04	-02	05	04	01	05	00	07	05
30.	18	27	19	19	18	09	09	08	06	07	09	16	22	15	16	17	26	10
31.	06	03	00	-03	02	01	04	05	04	04	07	05	04	01	00	04	-08	-04
32.	22	22	28	22	07	31	03	04	07	03	01	17	17	22	17	06	10	20
33.	-20	-21	-22	-16	-13	-18	-15	-15	-15	-15	-13	-20	-21	-21	-17	-15	-14	-09
34.	-25	-24	-27	-22	-14	-19	-10	-13	-15	-14	-11	-21	-22	-24	-21	-15	-18	-21
35.	21	21	19	14	18	07	20	23	21	23	21	23	25	22	20	22	20	09
36.	-04	07	-06	05	14	-07	02	05	02	04	08	-02	07	-03	05	14	06	-15
37.	24	29	22	29	26	21	23	21	16	22	23	26	29	22	29	29	20	05
38.	11	05	10	04	01	08	04	05	05	06	03	10	05	09	06	02	05	07
39.	16	11	14	01	-05	-04	06	03	07	05	03	14	09	12	03	-03	12	23

[1] Decimal points have been omitted.

items 252 through 300 (key 10II, column 10) predicted the potential rating at the .49 level. The cross validities obtained for the same creativity checklist key (10II) against the other criteria can be ascertained by reading down this column (column 10). For example, this key predicted the potential rating and number of awards composite, row 24, at the .51 level. By following column 10 down to variable or row 38, the control variable for grade, it can be seen that the creativity checklist key correlated .06 with this control variable.

Variables (rows) 25 through 31 represent the art area identification criteria. These measures were included in the matrix in order to ascertain if differences in keyscores existed for each art area versus the other art areas. Variables (rows) 32 through 35 are the school identification criteria. Similarly, these variables were included to ascertain if differences in keyscores existed for schools. Finally, variables 36 through 39 represent the control variables. The relationships between these measures and the BI keys were also examined.

In examining the cross validities in Table 11, a different terminology will be used to describe the degrees of cross validity. While a correlation between two criteria, such as that between two ratings, was considered high if it was above .60, a cross validity of greater than .40 represents a comparatively high degree of predictive effectiveness since cross validities of greater than .40 are relatively rare in prediction studies (Ghiselli, 1955). Finally, since all of the BI keys had an N equal to 501, the sample size on which each of the cross validities in Table 11 were computed can be ascertained by the sample size for each criterion or control score presented in Table 9.

In examining the patterns of correlations across the rows and columns of the matrix, it will be noticed that the validities vary noticeably in terms of criterion measure being considered. Thus, the first three ratings had comparatively lower cross validities than the potential rating and as one proceeds down the matrix, it will be noticed that some criterion variables were relatively impervious to prediction while others were consistently predicted at a relatively high level by a number of BI keys. In terms of the most valid keys, the patterns of correlations indicated that, generally, the most valid BI keys were those constructed on the art items, keys 7II through 11II on BI items 252-300.

The highest cross validities for the four ratings ranged from .40 for the expression of self rating to .49 for the potential rating. These validities resulted from the BI key constructed to predict the creativity checklist criteria on BI items 252 through 300 (key 10II). The potential rating key based on all BI items (key 14T) also had a cross validity of .49 against the potential rating. These cross validities compared well to the validities obtained in other prediction studies in all areas of psychological prediction, i.e., not just art, which indicated that the BI could make a significant contribution to the identification of talent in the arts.

The music checklist item measuring ability to compose (row 5) and the mean of the music checklist items (row 6) were not as predictable as

the ratings. The most valid key in predicting these criteria was the sensitivity rating key (key 7II) which had a cross validity of .29 (N = 101) against the ability to compose item and a cross validity of .34 against the music checklist mean score criterion (N = 149). These were the lowest cross validities obtained for any area of the arts, but still indicated that the BI could potentially make a worthwhile contribution to the selection of music talent.

The visual art checklist items (rows 7 through 10) were more predictable than the music checklist criteria. To illustrate, the aesthetic quality checklist item (row 7) was predicted with a cross validity of .50 (N = 102) by the creativity checklist key 10II. The highest cross validities for the remaining checklist items in the art section were as follows. For the clear image of products item (row 8), the cross validity was .46 (N = 101); for the creative imagination item (row 9), the cross validity was .39 (N = 102); and for the art checklist mean (row 10), the cross validity was .48 (N = 102). Generally, the most valid key in predicting the art checklist items was key 10II, the creativity checklist key constructed on the BI items concerned with experiences in the arts.

The dance checklist criteria (rows 11 and 12) were predicted at rather substantial levels by the BI keys; although, the cross validities were based on a sample size of only 52. Motivation rating key 13T had the highest cross validities against both of the dance criteria. These cross validities were .42 for composition and arrangement in dance and .44 for the dance checklist mean. The theater checklist criteria (rows 13 and 14) were also predicted at rather substantial levels. The creativity checklist key based on all BI items (key 15T) had a cross validity of .54 (N = 54) against the theater checklist item measuring ability to concentrate and make a part believable, while both potential rating keys 3I and 14T had cross validities of .38 (N = 54) against the theater checklist mean.

In reviewing the cross validities for predicting the separate art area criteria (rows 5 through 14), the predictive effectiveness of the BI was considerably above that which is usually obtained in concurrent cross validation studies in predicting performance across professions or occupations. While the music checklist criteria were limited, the visual art, dance and theater criteria were all predicted at the .38 level or above. Although more conclusive information regarding the predictive effectiveness of the BI should be obtained in longitudinal predictive validity investigations, the above results indicate the potential importance of the BI in a valid selection and placement program for students in the different areas of the arts.

The creativity checklist mean (row 15) was predicted at the .32 level (N = 377) by its own key (key 15T). This cross validity was modest in magnitude and may in part have been a function of the creativity checklist items comprising this criterion, which were based upon constructs (ascendency, quality of ideas, etc.) rather than measures of actual performance. However, the importance of this criterion, and the keys developed to predict it (keys 4I, 10II and 15T), was demonstrated by the cross validities obtained for creativity checklist key 10II against the rating and art area checklist criteria.

The two peer nomination criteria, technical competence--any level (row 16) and personal style--any level (row 17), were predicted at the .22 (N=52) and .36 (N=52) levels respectively, by sensitivity rating key 12T. The two art GPA criteria, major art area GPA (row 18) and combined major and minor art areas GPA (row 19), were predicted at the .39 (N=287) and .37 (N=314) levels respectively, by the key constructed to predict the latter criterion across all BI items (key 16T). With the exception of the peer nomination criterion for technical competence, these cross validities were all moderate, but not of the order of magnitude as that generally received for the rating and checklist criteria.

The academic GPA criterion (row 20) was predicted by the a priori Academic Performance Key (1A) at the .67 level (N=315). This cross validity was comparable to those found in the Alpha study on North Carolina high school students. It was interesting that motivation key 2I and art GPA key 5I had cross validities of .49 (N=315) and .52 (N=315) against the academic GPA criterion. These results provided evidence that a subset of items within general BI items 1 through 199 were commonly measuring motivation to achieve in school, regardless of whether the achievement was in the arts or the academics. This common purpose was not, however, evident for the BI items concentrating on the arts (items 252 through 300).

The self report number of awards criterion (row 21), standardized by art area, was predicted at the .39 level (N=317) by creativity checklist key 15T. The composite criteria (rows 22 through 24) were also substantially predicted by the BI keys. The motivation rating and number of awards composite (row 22) was predicted at the .53 level (N=220) by sensitivity rating key 12T, motivation rating key 13T, and creativity checklist key 15T. The expression of self rating and number of awards composite (row 23) was predicted at the .49 level (N=206) by sensitivity rating key 12T and creativity checklist key 15T. The final composite criterion, potential rating and number of awards (row 24), was predicted at the .57 level (N=199) by sensitivity rating key 12T and the key constructed on all BI items to predict the potential rating (key 14T). The cross validities received for predicting the composites were, without exception, very substantial and demonstrated the beneficial effects of combining relevant criteria of performance for prediction purposes.

In summary of the cross validities obtained for the BI keys against the performance criteria (rows 1 through 24), it was apparent that biographical data generally maintained a high degree of efficiency in predicting performance in the arts. This high degree of predictive efficiency was obtained for predicting both criteria employed to assess performance across art areas, such as the ratings and composites, and within art areas, such as the visual art, dance and theater checklist means. The BI keys that provided the highest level of prediction were based upon either the art BI items (252 through 300) or all BI items combined. However, an examination of the cross validities obtained for the BI keys constructed on general BI items (items 1 through 199 plus 218, or keys 1I through 6I) demonstrated that these keys were also generally effective in predicting the performance criteria. Key 6I, the BI key constructed to predict the art versus non-art criterion for the

combined art and non-art (SF) sample was generally valid in predicting the art performance criteria; although, in all cases this key was not as effective as the BI keys with the highest cross validities against the performance criteria.

The two a priori keys, the Academic Performance Key (1A) and the IBRIC Creativity Key (2A), were generally not as effective as the BI keys empirically constructed to predict the performance criteria. The Academic Performance Key did have the highest cross validity for predicting the academic GPA criterion (.67), which demonstrated the predictive efficiency of this key against an academic criterion. A further interesting pattern of results concerned the validities of the Academic Performance Key for the motivation criterion (.30), clear image of products (.42), visual art checklist mean (.42) and the two art GPA measures (.34 and .31). These validities were in part a function of the before discussed underlying motivation component in the first set of general biographical items. Secondly, the validity of .42 between the Academic Performance Key and the clear image of product visual art checklist item, which was designed to measure deliberateness, provided support to Burkhart's (1964) spontaneous-deliberate continuum. This was predicated upon the assumption that a major underlying construct measured by the Academic Performance Key is convergent thinking. Of major interest was the predictive effectiveness of the IBRIC Creativity Key against the art performance criteria. This a priori creativity key had validities in the .20's against the four ratings, aesthetic quality, creative imagination, the visual art checklist mean, peer nominations on personal style, number of awards and the first two criterion composites. Validities in the .30's were received for the theater checklist criteria and the potential rating and number of awards composite. On some criteria the scientific creativity key was noticeably more valid than the academic BI key and it is these criteria that evidently bear a closer relationship to scientific performance. The criteria where this tended to be most characteristic were the following: the expression of self criterion, the potential criterion, the music composition criterion, the theater checklist mean, peer nominations for personal style, the composite consisting of the expression of self rating and the number of awards, and the composite made up of the potential rating and number of awards. Although only moderate validities were obtained for the creativity key, these results provided evidence that biographical correlates of creative performance are at least somewhat in common across scientific, engineering and artistic fields.

The relationships between the BI keys and the art area measures (rows 25 through 31) demonstrated that the visual art students (row 25) had a low but significant tendency to have scores on the BI keys that were lower than the scores of students in other art areas. For example, the visual art measure correlated -.23 with BI key 2I, -.22 with BI key 4I, -.25 with BI key 13T, and -.23 with BI key 16T (all N's were 459 for the preceeding cross validities). On the other hand, the music (instrument) students (row 30) had a low but somewhat significant tendency to have scores on the BI keys that were higher than the scores for students in other art areas. However, the pattern of positive relationships for the music (instrument) students was not as consistent as the pattern of negative relationships received for the visual art students.

These patterns of relationships were similar to those obtained in the correlations between criterion performance dimensions and the art area measures, which subsequently were reflected by the BI keys constructed to predict the criteria.

An examination of the relationships between the BI keys and the school measures (rows 32 through 35) revealed that the two art schools (rows 32 and 35) had a low but significant tendency to have higher scores on the BI keys. This was evidenced by the positive correlations received for these two schools across the keys, and the low but generally significant negative correlation between the two high school variables (rows 33 and 34) and the BI keys. This was an expected result due to the fact that the two art schools selected students on the basis of artistic capabilities.

The relationships between the BI keys and the control variables for likeability (row 36), grade (row 38), and sex (row 39) were generally nonsignificant. For the few relationships that were significant, the correlations were all below .16, with the exception of the correlation of .23 (N=500) between the a priori IBRIC Creativity Key and sex. This correlation demonstrated that males tended to score slightly higher than females on this key, which was a direct function of the fact that this key was developed on male scientists and engineers. The correlations between the BI keys and the experience control variable were in the .20's or lower. Although significant, these relationships were not of a sufficient magnitude to justify correction.

Item Analysis Results for the Climate Items on the Art Sample

An item analysis in a double cross validation design was conducted for the climate items on the art sample at the same time as the item analysis of the BI items. The criterion and control scores entering into the item analysis of the climate items for the art sample were the same as those used for the item analysis of the BI items. These 39 criterion and control scores were presented previously in Table 9. The five criteria used for key generation purposes in the analysis of the climate items were the same as those used in the item analysis of the BI items. The means and standard deviations for these five climate keys are presented in Table 12. The five climate keys, designated 1C through 5C, were based upon all climate items, i.e., items 200 through 217 and items 219 through 251. Separate climate subscores were not constructed for items 200 through 217 and items 219 through 251 because the maximum possible stability in prediction was desired for this exploratory section of the BI.

As presented in Table 12, the means for the climate keys were all above 100.00, ranging from 101.03 to 103.31. In a fashion similar to that of the BI keys, the climate keys were sensitive to the negative skews in the criterion data. However, the standard deviations obtained for the climate keys were substantially less than those received for the BI keys. This was due to the fact that the climate keys were constructed on fewer items than the BI keys except in the case of the BI art items.

The total sample cross validities obtained for the climate keys in

Table 12

MEANS AND STANDARD DEVIATIONS FOR CLIMATE KEYS
ON ITEM ANALYSIS OF THE ART SAMPLE[1]

Key	Mean	S.D.
1C. Sensitivity Rating Key	101.09	3.13
2C. Motivation Rating Key	102.53	4.08
3C. Potential Rating Key	101.03	4.59
4C. Creativity Checklist Key	101.12	3.18
5C. Combined Major and Minor Art GPA Key	103.31	4.38

[1] The sample size was 501 for all keys.

predicting the performance criteria are presented in Table 13. The matrix is read in the same manner as the cross validation matrix for the BI keys, i.e., rows represent the criterion and control scores and columns represent the empirically developed climate scoring keys. The sample size for each cross validity is again equal to the sample size for the criterion (Table 9) since all 501 art students received scores on the climate keys.

The highest cross validities obtained for predicting the rating criteria (rows 1 through 4) ranged from .24 to .35. The sensitivity key (1C) and the motivation key (2C) had cross validities of .24 (N=342) against the sensitivity rating criterion. The motivation key also had a cross validity of .35 (N=356) against the motivation rating criterion. The potential key (3C) had cross validities of .24 (N=341) and .33 (N=320) against the expression of self rating criterion and the potential rating criterion, respectively. The cross validities for the climate keys against the rating criteria were all lower than the cross validities received for the BI keys against the same criteria. However, as discussed above, the climate keys had smaller standard deviations than the BI keys, indicating that additional climate items should be examined in future studies. From another standpoint, however, the generally moderate cross validities received for the exploratory climate section against the rating criteria provided evidence that a student's perception about the school in which he or she functions is related to his or her performance in that school.

The music checklist criteria (rows 5 and 6) were, with one exception, not predicted significantly by the climate keys. The exception was a cross validity of -.21 (N=101) between the music checklist item for composition and the climate key constructed to predict art GPA (5C). Although low, this negative cross validity reflected the tendency for students rated above average in composition in music to have somewhat low scores on the climate items relating to art GPA.

In contrast to the music checklist criteria, the visual art checklist criteria (rows 7 through 10) were generally predicted rather substantially by the climate keys. The aesthetic quality checklist item (row 7) was predicted at the .49 level (N=102) by the sensitivity climate key (1C) and the motivation climate key (2C). Clear image of products (row 8) was predicted at the .43 level (N=101) by the motivation climate key (2C) and the art GPA climate key (5C). The sensitivity climate key (1C) had a cross validity of .34 (N=102) against the checklist item for creative imagination (row 9), while the motivation climate key (2C) had a cross validity of .46 (N=102) in predicting the visual art checklist mean (row 10). On the basis of this information, it was apparent that perceptions of climate on the part of the visual art students was rather substantially related to performance in the visual arts.

The dance checklist criteria (rows 11 and 12) were not significantly predicted by the climate keys. The highest cross validities received for predicting each of the two criteria were .24 (N=52). The theater checklist item measuring concentration and making a part believable (row 13) was somewhat highly predicted by the creativity checklist climate key (4C), as this cross validity was .38 (N=54).

Table 13

CROSS VALIDITIES AND CORRELATIONS BETWEEN CLIMATE KEYS AND CRITERION AND CONTROL SCORES FOR THE ART SAMPLE[1]

	Climate Keys				
	1C	2C	3C	4C	5C
1.	24	24	19	17	20
2.	30	35	25	21	30
3.	22	23	24	18	15
4.	25	26	33	17	16
5.	04	-11	00	-05	-21
6.	06	11	09	08	-03
7.	49	49	43	40	39
8.	38	43	26	36	43
9.	34	28	23	21	26
10.	44	46	32	34	41
11.	17	24	-07	17	22
12.	10	21	09	24	17
13.	33	36	30	38	29
14.	16	22	23	21	16
15.	18	24	18	14	18
16.	14	00	10	-21	09
17.	30	15	31	-01	22
18.	35	38	25	24	34
19.	33	37	20	20	32
20.	15	13	03	14	17
21.	24	20	24	25	15
22.	36	36	38	31	29
23.	30	29	35	29	22
24.	31	30	41	28	18
25.	-18	-21	-24	-17	-19
26.	04	04	09	-03	00
27.	-02	04	-03	04	07
28.	01	-05	-01	-07	-10
29.	03	-04	-02	-01	04
30.	09	09	10	12	13
31.	05	08	11	06	02
32.	-05	11	15	27	03
33.	-14	-19	-22	-17	-17
34.	-04	-06	-14	-07	-05
35.	20	13	20	-01	17
36.	05	09	-02	04	13
37.	16	17	18	15	13
38.	00	-07	10	-05	-05
39.	09	03	10	00	-02

[1] Decimal points have been omitted.

However, the theater checklist mean (row 14) was not significantly predicted at the climate keys. The creativity checklist mean (row 15) was significantly predicted at the .24 level (N=377) by motivation climate key 2C. The peer nomination measure for technical competence was not significantly predicted by the climate keys. However, the peer nomination criterion for personal style was significantly predicted at the .31 level (N=52) by the potential rating climate key (3C).

The art GPA criteria (rows 18 and 19) were predicted at moderate levels by the climate keys. Major art area GPA (row 18) was predicted at the .38 level (N = 387) by motivation climate key (2C). This same key had a cross validity of .37 (N=314) against the combined major and minor art GPA criterion (row 19). The academic GPA criterion (row 20) was predicted at the .17 level (N=315) by art GPA key (5C). These results were similar to those received for the BI keys in predicting the GPA criteria, i.e., the climate keys constructed to predict performance criteria in the arts were quite effective in predicting GPA's in the arts, but were not very effective in predicting GPA in the academic area.

The corrected self report number of awards criterion (row 21) was predicted at the .25 level (N=317) by creativity checklist key 4C. The composite criteria (rows 22 through 24) were predicted at moderate levels by the climate keys. For example, the motivation rating and number of awards composite (row 22) was predicted at the .38 level (N=220) by the potential rating climate key (3C). This same climate key had cross validities of .35 (N=206) and .41 (N=199) against the expression of self and number of awards composite, and the potential rating and number of awards composite, respectively.

In summary, the climate keys had generally moderate cross validities against a number of the performance criteria, particularly the ratings, the visual art criteria, the art GPA criteria, and the composite criteria. However, the climate keys were generally not effective in predicting criteria within the music, dance, or theater (with one exception) art areas. In addition, all of the significant cross validities received for the climate keys against the performance criteria were lower than the cross validities received for the BI keys in predicting the same criteria. However, since the climate section of the BI was included in the present investigation for exploratory purposes, and a number of significant cross validities were obtained, the results indicated that future investigations of the relationships between school or organizational climate and performance in the arts is a very fruitful area of research.

The correlations between the climate keys and the art area measures (rows 25 through 31) were in all cases rather low, and generally not significant. However, a pattern of low but significantly negative relationships did exist between the visual art major variable (row 25) and the climate keys. Also, a pattern of very low but significant positive relationships existed between the music (instrument) variable (row 30) and the climate keys. These results were very similar to those found between the BI keys and these two identification criteria. These results indicated that the students in the visual arts had a

tendency, although not strong, to score lower on the climate keys than students in the other art areas, while students in instrumental music had a slight tendency to have higher scores.

The patterns of correlations between the climate keys and the school measures (rows 32 through 35) demonstrated a pattern similar to that found for the BI keys against these same criteria. The students in the two high schools (rows 33 and 34) had a slight tendency to have lower scores on the climate keys than the students in the art schools (rows 32 and 35). The relationships between the climate keys and the control variables (rows 36 through 39) were, with the exception of the experience control variable (row 37), very low and either not significant or bordering on significance. The correlations of the climate keys with experience were all significant, but below .20.

Predictive Effectiveness of the Academic Achievement Tests

The means, standard deviations (all in terms of percentiles), and sample sizes for achievement tests available for the art sample students are presented in Table 14. Table 15 presents the validities of these tests against the 24 art performance criteria, and the correlations between the tests and the control scores for the art sample.

The mean percentiles for the art sample were all above .50, with the exception of the NMSQT-Math mean which was .48. These results indicated that the art sample was comprised of students generally above average academically. The sample size for any particular test varied between 55 and 106, which was a result of somewhat different tests being administered at the different schools. The NEDT was administered at Art School A only; the PSAT was not administered at High School B, and no academic achievement tests were available from Art School B.

The validities between the academic achievement tests and the art performance criteria in Table 15 must be examined with caution due to the small and varied sample sizes of students who had both tests and criteria, varying from 0 to 106. The significant validities have been identified in the table; however, caution is again advised as some of the significant validities are based on sample sizes of 7 and 10. These will be identified in the text.

In examining Table 15, it is apparent that the achievement tests were generally poor and nonsignificant predictors of performance in the arts. The only criterion for which the academic achievement tests had a consistent pattern of significant validities was academic GPA (variable 20), which, of course, was not an art criterion. For art criterion variables 1 through 19, the significant validities were generally based on sample sizes of less than 15 (most frequently 7 or 10) and were therefore highly contaminated by sampling error. Exceptions to this were the validities between: NMSQT-Math Usage and the motivation rating (.20, N = 90); NEDT-composite and the creativity checklist mean (.46, N = 39); PSAT-Verbal and the peer moninations on personal style (.39, N = 34); NMSQT-Word Usage and the peer moninations on personal style criterion (.38, N = 35). These were the only performance criterion

Table 14

MEANS, STANDARD DEVIATIONS AND SAMPLE SIZES
OF ACADEMIC ACHIEVEMENT TESTS
FOR THE ART SAMPLE

No.	Description	Mean	S.D.	N
1.	ACT Weighted Composite	.60	.25	78
2.	PSAT Verbal	.82	.16	86
3.	PSAT Math	.82	.15	86
4.	NMSQT English Usage	.61	.28	106
5.	NMSQT Math Usage	.48	.28	106
6.	NMSQT Social Studies	.58	.27	106
7.	NMSQT Word Usage	.60	.27	106
8.	NEDT Composite	.90	.11	55

Table 15

CROSS VALIDITIES AND CORRELATIONS BETWEEN ACADEMIC ACHIEVEMENT TESTS AND CRITERION AND CONTROL SCORES FOR THE ART SAMPLE[1]

	ACT WGHTD. COMP.	PSAT VERBAL	PSAT MATH	NMSQT ENGLISH USAGE	NMSQT MATH USAGE	NMSQT SOCIAL STUDIES	NMSQT WORD USAGE	NEDT COMP.
1.	17	03	-06	06	05	01	04	02
2.	11	11	11	18	20*	12	13	26
3.	06	-02	00	03	14	00	00	18
4.	07	06	04	13	16	02	04	10
5.	-04	-09	09	-16	-08	-26	-30	50*
6.	07	-03	11	-05	-02	-08	-08	06
7.	09	-08	-45	39	15	18	29	00
8.	20	60*	33	33	-03	36	45	00
9.	11	00	-23	00	04	-19	-15	00
10.	13	21	-17	32	14	20	29	00
11.	-02	00	00	-14	61	-52	-23	00
12.	07	00	00	-13	73	-52	-29	00
13.	-44	24	-12	36	13	19	34	61
14.	-87	52	74*	20	70*	65*	79*	86
15.	07	12	18	09	18	14	12	46*
16.	00	32	18	40	00	04	26	24
17.	00	39*	10	29	-03	10	38*	27
18.	19	-04	11	20	15	00	-03	-02
19.	14	-05	11	17	18	05	-04	07
20.	51*	42*	44*	48*	42*	45*	34*	60*
21.	-23	-05	00	10	00	-14	-15	02
22.	-04	11	15	19	20	-01	00	19
23.	-06	-05	02	03	10	-14	-17	00
24.	00	03	11	11	11	-17	-14	-03
25.	-45*	-16	-36*	-28*	-21*	-08	-12	07
26.	-05	09	15	03	-13	-02	01	09
27.	-04	04	11	12	00	01	-02	-22
28.	03	09	-02	01	-04	02	09	07
29.	27*	-06	-02	03	19	19	16	00
30.	33*	03	22	11	33*	10	00	00
31.	24*	00	-18	00	-25*	-21*	-03	00
32.	20	14	19	14	03	00	06	00
33.	-05	-15	-22*	-17	05	12	07	00
34.	-04	00	00	01	-12	-16	-16	00
35.	00	00	00	00	00	00	00	00
36.	-06	-08	11	-06	08	-09	-12	12
37.	18	-07	14	12	17	-16	-08	11
38.	-12	20	30	25*	28*	15	23*	27*
39.	07	-06	-04	-11	23*	21*	07	14

[1] * = $p < 05$; decimal points have been omitted.

measures, including GPA's in the arts, with sample sizes greater than 15 that were significantly predicted by the academic achievement tests. On the basis of this information, it was tentatively concluded that performance in academic areas was only lowly related to performance in artistic areas. However, this must be a tentative conclusion for two reasons, (1) the generally small sample sizes on which the validities for the achievement tests were based, and (2) the possibility of restriction of range on the achievement tests, the criteria, or both.

The validities for the achievement tests in predicting the corrected number of awards and composite criterion measures (variables 21 through 24) were all nonsignificant. The same two qualifications presented in the preceding paragraph are appropriate for these relationships. The correlations between the achievement tests and the art area measures (variables 25 through 31) were all based on sample sizes varying between 42 and 91. Some interesting patterns were provided by this information. For example, the students in the visual arts had significantly lower scores than students in other art areas on the ACT-weighted composite (-.45, N = 70), PSAT-Math (-.36, N =70), NMSQT-English Usage (-.28, N = 91), and NMSQT-Math Usage (-.21, N = 91). A definitive pattern was not found for students in the areas of theater, dance or creative writing. Students in speech (variable 29) had a slightly higher mean on the ACT than students in other areas (.27, N = 70); although, they were neither higher nor lower than other students on the remainder of the academic tests. Students in instrumental music (variable 30) had comparatively higher scores on the ACT (.33, N = 70) and NMSQT-Math Usage (.33, N = 91). Finally, music students in voice had a somewhat higher mean on the ACT (.24, N = 70); however, they were significantly lower than students in the other art areas on NMSQT-Math Usage (-.25, N = 91) and NMSQT-Social Studies (-.21, N = 91). Some of these results, particularly where only one test was involved, could be due to different kinds of standardization samples and, hence, should be interpreted cautiously.

On the basis of the above information, it appeared that students in the visual arts generally performed less well on academic achievement tests than did students in other areas of the arts. Instrumental music students tended to perform somewhat better on achievement tests than other students in the arts; although the magnitude of the correlations was not large. Finally, no definitive differences were apparent between art areas and performances on different dimensions of academic achievement; i.e., math versus verbal, as measured by standardized achievement tests.

The academic test scores were not generally correlated significantly with the school measures (variables 32 through 35), which was probably attributable to the fact that different tests were administered in different schools. The achievement test scores also were not generally correlated with the control scores (variables 36 through 39). Exceptions to this were the low but significant correlations between grade level (variable 38) and three of the four NMSQT scores and the NEDT score, indicating the tests were given in different grade levels, and the very slight tendency for males to score higher than females on two of the eight tests.

Correlations Between the Academic Achievement Tests, the BI Keys, and the Climate Keys for the Art Sample

The correlations of the above predictor measures are presented in Table 16. The sample size corresponding to each correlation is presented in Table 17. The intercorrelations among the academic achievement tests (variables 1 through 8) were generally based upon small sample sizes. However, the intercorrelations were moderate to high, which indicated that the academic tests as a whole were measuring similar dimensions of ability. These abilities have been considered to be of a memory, cognitive, or convergent nature as opposed to a divergent nature (Guilford, 1964).

The academic achievement tests were generally not highly correlated with the BI keys empirically developed in this study to predict the art performance criteria (1I through 16T). In reference to the sections of the BI, the academic achievement tests generally had low to moderate correlations with the BI keys constructed on items 1 through 199 and 218 (except for key 6I). These BI keys (1I through 6I) were constructed on general BI items in which items concerning previous academic achievement were included. BI keys based on the artistically oriented items (items 252 through 300 and BI keys 7II through 11II) were generally not significantly correlated with the academic achievement tests, although a number of low but nonsignificant negative correlations were obtained. This reflected the different dimensions being measured by the academic achievement tests and the BI keys constructed on art BI items to predict art performance criteria. Finally, the BI keys based on all BI items (keys 12T through 16T) were moderately correlated with the ACT composite score (variable 1) and lowly or not significantly correlated with the remaining academic achievement tests.

The a priori Academic Performance Key (1A) was generally moderately correlated with the academic achievement tests although the correlations ranged as high as .62 with the ACT composite. Since this key was constructed to predict academic performance, the generally moderate correlations with other academic predictors were expected. The IBRIC Creativity Key had low and nonsignificant to moderate and significant correlations with the academic achievement tests. The moderate correlations were a function of the fact that this BI key was constructed to predict scientific and engineering creativity which does have some demonstrable intellectual components (Taylor and Ellison, 1964).

The correlations between the climate keys (1C through 5C) and the academic achievement tests were generally low and nonsignificant. Those correlations that were significant were of borderline significance and generally negative. On the basis of this information, it would appear that perceptions of climate, based on items with demonstrated significance in moderately predicting art performance criteria, were generally not related to performance on academic achievement tests, although a slight tendency for inverse relationships existed.

CORRELATIONS BETWE
BI KEYS AND CLIM

No.	Description	1	2	3	4	5	6	7	8	1I	2I	3I
1.	ACT Weighted Composite	--										
2.	PSAT Verbal	70	--									
3.	PSAT Math	24	58	--								
4.	NMSQT English Usage	67	60	52	--							
5.	NMSQT Math Usage	46	31	61	50	--						
6.	NMSQT Social Studies	65	55	42	61	60	--					
7.	NMSQT Word Usage	76	71	33	65	39	71	--				
8.	NEDT Composite	67	67	41	65	52	53	63	--			
	BI Keys											
1I.	Sensitivity Rating Key	48	09	00	26	-03	17	23	35	--		
2I.	Motivation Rating Key	49	21	17	32	13	19	21	32	83	--	
3I.	Potential Rating Key	37	04	-03	18	-07	10	17	30	90	76	--
4I.	Creativity Checklist Key	44	-06	-03	14	-04	03	09	14	74	79	71
5I.	Comb. Maj.-Min. GPA Key	48	33	29	32	11	19	18	32	55	80	43
6I.	Art vs. Non-art Key	11	-13	-14	-02	-28	-19	00	17	66	50	72
7II.	Sensitivity Rating Key	20	-31	-14	00	-07	-17	-11	01	58	50	59
8II.	Motivation Rating Key	15	-27	-17	-03	-12	-15	-14	02	55	53	58
9II.	Potential Rating Key	16	-27	-15	-05	-17	-19	-13	03	58	48	61
10II.	Creativity Checklist Key	17	-29	-16	-03	-11	-19	-12	04	54	48	56
11II.	Comb. Maj.-Min. GPA Key	17	-19	-10	-01	-06	-11	-12	-04	50	53	49
12T.	Sensitivity Rating Key	41	-08	-06	18	-05	04	11	26	94	79	88
13T.	Motivation Rating Key	40	00	03	20	02	05	07	22	82	92	78
14T.	Potential Rating Key	31	-10	-09	10	-12	-02	06	22	86	72	94
15T.	Creativity Checklist Key	37	-18	-10	08	-08	-08	00	11	75	75	73
16T.	Comb. Maj.-Min. GPA Key	42	17	19	24	06	10	08	23	61	82	51
1A.	Academic Performance Key	62	37	39	48	47	52	41	56	60	75	49
2A.	IBRIC Creativity Key	38	11	03	11	01	23	28	39	70	58	75
	Climate Keys											
1C.	Sensitivity Rating Key	21	-23	-16	18	00	-01	01	-05	33	27	29
2C.	Motivation Rating Key	15	-20	-01	06	-08	-13	-11	-04	32	36	29
3C.	Potential Rating Key	25	-31	-15	05	-11	-14	-05	-20	44	36	48
4C.	Creativity Checklist Key	14	-32	-17	-01	-18	-19	-15	-28	27	29	26
5C.	Comb. Maj.-Min. GPA Key	13	-04	-06	10	-07	-11	-06	02	21	33	18

Table 16

ACADEMIC ACHIEVEMENT TESTS,
E KEYS FOR THE ART SAMPLE[1]

I	5I	6I	7II	8II	9II	10II	11II	12T	13T	14T	15T	16T	1A	2A	1C	2C	3C	4C
--																		
27	--																	
28	57	--																
34	55	90	--															
25	60	94	93	--														
28	54	91	91	91	--													
45	50	75	85	74	73	--												
50	70	82	76	80	76	66	--											
71	59	75	81	75	74	75	88	--										
39	75	81	80	85	78	65	94	85	--									
53	59	77	77	78	83	61	84	86	83	--								
94	40	51	59	48	50	74	64	83	56	64	--							
66	23	29	28	27	29	27	54	64	45	55	61	--						
30	63	45	41	48	41	34	70	58	71	55	36	52	--					
16	20	46	42	45	49	25	42	38	39	51	22	25	22	--				
31	26	45	50	45	48	46	41	48	40	46	42	20	16	66	--			
14	42	54	52	57	55	36	53	48	57	56	25	22	35	70	66	--		
18	22	42	41	43	45	27	36	38	36	47	24	16	13	60	70	58	--	
36	13	27	36	27	30	42	26	39	24	27	44	19	06	35	70	33	52	--

Ta

SAMPLE SIZE FOR CORRELATIONS
BI KEYS AND CLIMATE KE

No.	Description	1	2	3	4	5	6	7	8	1I	2I	3I	4I	5I
1.	ACT Weighted Composite	78												
2.	PSAT Verbal	23	86											
3.	PSAT Math	23	86	86										
4.	NMSQT English Usage	28	79	79	106									
5.	NMSQT Math Usage	28	79	79	106	106								
6.	NMSQT Social Studies	28	79	79	106	106	106							
7.	NMSQT Word Usage	28	79	79	106	106	106	106						
8.	NEDT Composite	4	27	27	28	28	28	28	55					
	BI Keys													
1I.	Sensitivity Rating Key	78	86	86	106	106	106	106	55	501				
2I.	Motivation Rating Key	78	86	86	106	106	106	106	55	501	501			
3I.	Potential Rating Key	78	86	86	106	106	106	106	55	501	501	501		
4I.	Creativity Checklist Key	78	86	86	106	106	106	106	55	501	501	501	501	
5I.	Comb. Maj.-Min. GPA Key	78	86	86	106	106	106	106	55	501	501	501	501	501
6I.	Art vs. Non-art Key	78	86	86	106	106	106	106	55	501	501	501	501	501
7II.	Sensitivity Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
8II.	Motivation Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
9II.	Potential Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
0II.	Creativity Checklist Key	78	86	86	106	106	106	106	55	501	501	501	501	501
1II.	Comb. Maj.-Min. GPA Key	78	86	86	106	106	106	106	55	501	501	501	501	501
2T.	Sensitivity Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
3T.	Motivation Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
4T.	Potential Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
5T.	Creativity Checklist Key	78	86	86	106	106	106	106	55	501	501	501	501	501
6T.	Comb. Maj.-Min. GPA Key	78	86	86	106	106	106	106	55	501	501	501	501	501
1A.	Academic Performance Key	78	86	86	106	106	106	106	55	501	501	501	501	501
2A.	IBRIC Creativity Key	78	86	86	106	106	106	106	55	501	501	501	501	501
	Climate Keys													
1C.	Sensitivity Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
2C.	Motivation Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
3C.	Potential Rating Key	78	86	86	106	106	106	106	55	501	501	501	501	501
4C.	Creativity Checklist Key	78	86	86	106	106	106	106	55	501	501	501	501	501
5C.	Comb. Maj.-Min. GPA Key	78	86	86	106	106	106	106	55	501	501	501	501	501

Table 17

RELATIONS OF ACADEMIC ACHIEVEMENT TESTS,
CLIMATE KEYS FOR THE ART SAMPLE

4I	5I	6I	7II	8II	9II	10II	11II	12T	13T	14T	15T	16T	1A	2A	1C	2C	3C	4C	5C
501																			
501	501																		
501	501	501																	
501	501	501	501																
501	501	501	501	501															
501	501	501	501	501	501														
501	501	501	501	501	501	501													
501	501	501	501	501	501	501	501												
501	501	501	501	501	501	501	501	501											
501	501	501	501	501	501	501	501	501	501										
501	501	501	501	501	501	501	501	501	501	501									
501	501	501	501	501	501	501	501	501	501	501	501								
501	501	501	501	501	501	501	501	501	501	501	501	501							
501	501	501	501	501	501	501	501	501	501	501	501	501	501						
501	501	501	501	501	501	501	501	501	501	501	501	501	501	501					
501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501				
501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501			
501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501		
501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	
501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501	501

The intercorrelations among the BI keys (keys 1I through 2A) were generally moderate to high, with the exception of the correlations between the Academic Performance Key (1A) and the BI keys constructed on the art BI items (keys 7II through 11II), which were low (.20's). The interrelationship among the empirical keys was an expected result, as BI keys 1I through 16T were empirically constructed to predict correlated criteria. The same can be said for the intercorrelations among the climate keys (1C through 5C), which were also moderately to highly intercorrelated. The correlations between the BI keys and the climate keys were generally moderate.

In the case of the a priori BI keys, the majority of the correlations with the BI keys were moderate to high and for the climate keys the correlations were generally low. The pattern of correlations of the two a priori keys diverged occasionally across the empirical keys. This was especially true on key 6I, the key constructed to predict the art versus non-art criterion, as this key correlated .23 and .63 with the academic and creativity keys respectively. These results evidently illustrate a creative orientation on the part of art and science students. The moderate correlations between the empricially constructed BI keys (1I through 16T) and the empirically constructed climate keys were expected because all of the keys were constructed to predict either the same or related criteria. However, these moderate correlations did indicate that a somewhat sizable portion of the variance in the two sets of keys was not overlapped by the correlations between the sets of keys. This result subsequently provided support for the need to investigate both biographical and climate data in this and future studies.

Second Item Analysis--Art Versus Non-Art

As explained in the previous chapter of this report, a double cross validation item analysis was conducted on the combined art and non-art SF samples to predict an art versus non-art dichotomous criterion. Only the first 199 items of the BI were item analyzed for cross validation purposes since this was the only set of BI items in common for the two samples. Item 218 was not used in this item analysis because this item was employed to identify the non-art students.[7] The two cross validities obtained from this analysis in predicting the art versus non-art criterion were .68 (N = 407) and .65 (N = 406), the average being .67 (Fisher z). This average cross validity of .67 represented substantial prediction of the art versus non-art criterion and was comparable to the results found by Schaefer and Anastasi (1968) and Anastasi and Schaefer (1969). However, unlike the two studies above, the effectiveness of this key in predicting artistic performance criteria was investigated in this study. The art versus non-art key was presented as key 6I in the previously discussed analyses of the art sample. This key generally had a lower pattern of significant cross validities than all BI keys constructed to predict the art criteria on the sample of art students. Therefore, the BI keys constructed to predict artistic performance would be more appropriate

[7] This did not preclude the use of item 218 on art students only.

than the art versus non-art BI key in future endeavors concerning the prediction of artistic performance. However, the effectiveness of the empirically constructed BI keys in differentiating between art and non-art students was a relevant question and the subject of the next section of this report.

Comparisons Between the Art Sample, Non-Art SF Sample and Non-Art LF Samples on BI Keys

At the conclusion of the double cross validation analyses on the art sample and the combined art and non-art SF samples, a total sample item analysis was completed on the art sample. As explained in the previous chapter of this report, this item analysis was conducted on all 501 members of the art sample to predict the same five criteria as those employed in the double cross validation analysis of the art sample, i.e., the sensitivity, motivation and potential ratings, the creativity checklist mean, and the combined major and minor art GPA measure. The keys resulting from this analysis could not be cross validated because all members of the art sample were employed to construct the keys. However, these keys represented the most valid and stable keys that could be constructed in the present study and were those which would be used in any future selection, placement, description, etc., investigations. These same keys are those described in the following chapter where the life history and climate correlates of artistic achievement are presented.

A question of major importance in the present investigation was: Would BI keys constructed to validly predict performance for art students differentiate between art and non-art students? In order to answer this question, comparisons were made between the art, non-art SF, and non-art LF samples on mean keyscores for the five total art sample BI keys. The art sample was compared with the non-art SF sample to ascertain the effectiveness of the performance keys, based on general BI items, in differentiating between a true art sample and a true non-art sample. The art sample was also compared with the non-art LF sample on the general BI item performance keys to determine the extent to which students who had experience in the arts in a general non-school setting differed from students in the art sample. The students in the non-art LF sample were also compared with the students in the non-art SF sample on general BI item performance keys to further ascertain the type of students who comprised the non-art LF sample. Finally, the art sample was compared with the non-art LF sample on BI keyscore means based on the art BI items to determine the extent of differences in backgrounds, experiences, etc., in the arts for the two samples. Descriptive data for the art sample and the two non-art samples precede the comparisons.

Table 18 presents descriptive data for the art, non-art SF and non-art LF samples. In examining this table, Art School A is included in the description of the art sample only because essentially all students attending this school were in the arts. However, data for students in Art School A are included in the academic GPA, grade and sex measures on the art sample and in the comparisons of BI keys in the following tables. The proportions (means) of students from the

Table 18

DESCRIPTIVE DATA FOR THE ART, NON-ART SF AND NON-ART LF SAMPLES

Criterion and Control Scores	Art Sample			Non-Art SF Sample			Non-Art LF Sample		
	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	N
Art School A	.21	.41	501						
High School A	.26	.44	501	.34	.48	312	.20	.40	167
High School B	.21	.41	501	.26	.44	312	.27	.44	167
Art School B	.32	.47	501	.39	.49	312	.53	.50	167
Academic GPA	37.48	7.70	315	35.70	8.53	183	35.65	9.92	72
Grade	11.20	.84	488	11.25	.81	308	11.27	.75	166
Sex	.39	.49	500	.59	.49	312	.50	.50	167

other three schools in the art and non-art SF samples demonstrated that the students were divided relatively evenly across the three schools; although, students from Art School B were more numerous in the non-art LF sample.

The academic GPA's for the students in the three samples were quite homogeneous, ranging from 35.65 to 37.48 on a 40 point scale (10 to 50). The grade levels for the students across the three samples were also very homogeneous and ranged from 11.20 to 11.27. The variable for sex was not as homogeneous as 39% of the art sample was comprised of males, while males represented 59% of the non-art SF sample and 50% of the non-art LF sample.

Table 19 presents the comparisons between the art sample and the non-art SF sample on the five total art sample keys and the IBRIC Creativity Key. These total art sample key means were based upon the first 199 BI items that were common to the two samples. The statistic used for the comparison was the t-test, which was also converted to a correlation to examine the extent to which the BI keys predicted the art versus non-art criterion.

The comparisons of the means between the art versus non-art SF samples were all significant beyond the .01 level of significance. Therefore, the art performance keys were successful in separating art from non-art SF students. The non-art SF students also scored significantly lower ($p < .01$) than the art students on the IBRIC Creativity Key. The correlations ranged from .10 (combined major and minor GPA key) to .43 (potential rating key). By examining both the t-test and correlation information, it was apparent that the sensitivity rating key, the potential rating key, and the creativity checklist key substantially differentiated between art and non-art SF students. However, the correlations were not of the same order of magnitude as the .67 received for the art versus non-art key in the second item analysis.

Table 20 presents the comparisons between the art sample and the non-art LF sample on the five art sample keys and the IBRIC Creativity Key. These keys were again based on the first 199 BI items. The results of the t-tests demonstrated that the art sample had significantly higher means on the sensitivity rating key, the potential rating key and the creativity checklist key. Interestingly, the non-art LF sample was significantly higher than the art sample on the combined major and minor art GPA key. All correlations were low, which provided evidence that the BI keys were not particularly efficient in differentiating between the two samples. On the basis of these results, it was apparent that the non-art LF sample was somewhat comparable to the art sample in terms of responses to the first 199 general BI items; although, small but significant differences did exist. The comparison of the same two samples on the art BI items, however, led to quite different results, which will be presented later in this section of the report.

Table 21 presents the comparisons of mean BI keyscores for the non-art SF and non-art LF samples for the BI keys constructed on the first 199 BI items. This analysis demonstrated that the BI key means

Table 19

COMPARISON OF MEANS BETWEEN THE ART SAMPLE
AND THE NON-ART SF SAMPLE ON TOTAL SAMPLE KEYS
BASED ON BI ITEMS 1 THROUGH 199[1]

Total Sample Key Scores	Art Sample Mean	S.D.	N	Non-Art SF Sample Mean	S.D.	N	t	r
Sensitivity Rating Key	102.19	9.26	501	95.18	7.60	312	11.68**	.38**
Motivation Rating Key	102.02	11.15	501	97.19	9.97	312	6.44**	.22**
Potential Rating Key	102.22	13.13	501	91.32	9.49	312	13.63**	.43**
Creativity Checklist Key	98.83	7.04	501	94.02	5.76	312	10.69**	.35**
Combined Major and Minor Art GPA Key	102.05	9.31	501	100.19	9.55	312	2.74**	.10**
A Priori Creativity Key	107.91	6.77	501	103.85	6.61	312	8.46**	.28**

[1] * = $p < .05$; ** = $p < .01$

Table 20

COMPARISON OF MEANS BETWEEN THE ART SAMPLE
AND THE NON-ART LF SAMPLE ON TOTAL SAMPLE KEYS
BASED ON ITEMS 1 THROUGH 199[1]

Total Sample Key Scores	Art Sample			Non-Art LF Sample			t	r
	Mean	S.D.	N	Mean	S.D.	N		
Sensitivity Rating Key	102.19	9.26	501	100.29	8.05	167	2.53*	.10*
Motivation Rating Key	102.02	11.15	501	100.99	10.14	167	1.11	.04
Potential Rating Key	102.22	13.13	501	97.53	10.50	167	4.69**	.18**
Creativity Checklist Key	98.83	7.04	501	97.04	5.94	167	3.20**	.12**
Combined Major and Minor Art GPA Key	102.05	9.31	501	103.88	9.89	167	-2.10*	-.08*
A Priori Creativity Key	107.91	6.77	501	107.09	6.85	167	1.34	.05

[1] * = $p < .05$; ** = $p < .01$

Table 21

COMPARISON OF MEANS BETWEEN THE NON-ART SF SAMPLE AND THE NON-ART LF SAMPLE ON TOTAL SAMPLE KEYS BASED ON ITEMS 1 THROUGH 199[1]

Total Sample Key Scores	Non-Art SF Sample Mean	S.D.	N	Non-Art LF Sample Mean	S.D.	N	t	r
Sensitivity Rating Key	95.18	7.60	312	100.29	8.05	167	-6.72**	-.29**
Motivation Rating Key	97.19	9.97	312	100.99	10.14	167	-3.92**	-.17**
Potential Rating Key	91.32	9.49	312	97.33	10.50	167	-6.40**	-.28**
Creativity Checklist Key	94.02	5.76	312	97.04	5.94	167	-5.39**	-.24**
Combined Major and Minor Art GPA Key	100.19	9.55	312	103.88	9.89	167	-3.93**	-.18**
A Priori Creativity Key	103.85	6.61	312	107.09	6.85	167	-4.98**	-.22**

[1] * = $p < .05$; ** = $p < .01$

for the non-art SF sample were significantly lower than the BI key means for the non-art LF sample in every case. The correlations ranged from -.18 to -.29, which provided evidence that the BI keys constructed to predict artistic performance were moderately successful in differentiating between the two samples. By comparing the results of the above analysis with the previous two analyses, i.e., art versus non-art SF and art versus non-art LF, it was apparent that the non-art LF sample generally occupied a "middle ground" position between the art sample and the non-art SF sample in terms of mean keyscores on the first 199 BI items. This was a somewhat obvious result since the non-art LF sample was comprised of students who completed the total BI, indicating experience in the arts, but were not involved in courses in the arts at their respective schools.

The extent of the background and experience of the non-art LF sample in the arts was ascertained by comparing their mean keyscores on the five art sample BI keys for BI items 252 through 300 (art BI items) with the corresponding mean keyscores of the art sample. The results of this analysis are presented in Table 22. It was quite apparent from the results in this table that the mean BI keyscores for the art sample were substantially higher than the mean BI keyscores for the non-art LF sample. Secondly, the correlations provided the further evidence that the BI keys, based upon BI items concentrating on life history information in the arts, could rather substantially differentiate between the art sample and the non-art LF sample as the correlations ranged from .34 to .38. On the basis of these results, it was apparent that although the students in the non-art LF sample had enough experience in the arts to answer art BI items 252 through 300, their proficiency in the arts was less than that of the students in the art sample. The results suggested that the students in the non-art LF sample either were not, or would not be, as successful in artistic endeavors as the students comprising the art sample. This inference was predicated upon the fact that the five BI keys on which the art and non-art LF samples were compared were based upon cross validated BI keys that were generally highly valid in predicting artistic performances in the art sample. However, this suggestion could be only tentative due to the fact that the students in the non-art LF sample had less experience than the students in the art sample. The mean number of years of experience in the arts was approximately 3 for the students in the non-art LF sample and 6 for the students in the art sample.

Table 22

COMPARISON OF MEANS BETWEEN THE ART SAMPLE AND THE NON-ART LF SAMPLE ON TOTAL SAMPLE KEYS BASED ON ITEMS 252 THROUGH 300[1]

Total Sample Key Scores	Art Sample			Non-Art LF Sample			t	r
	Mean	S.D.	N	Mean	S.D.	N		
Sensitivity Rating Key	102.82	7.03	501	96.35	6.74	167	10.61**	.38**
Motivation Rating Key	104.52	8.14	501	96.92	7.75	167	10.70**	.38**
Potential Rating Key	101.69	9.74	501	92.86	8.43	167	10.55**	.38**
Creativity Checklist Key	101.83	5.36	501	96.82	5.70	167	10.02**	.36**
Combined Major and Minor Art GPA Key	104.67	5.72	501	99.66	5.97	167	9.45**	.34**

[1] * = $p < .05$; ** = $p < .01$

CHAPTER V - EXAMPLES OF BIOGRAPHICAL AND CLIMATE CORRELATES OF ARTISTIC ABILITY

This chapter will present a discussion of the items included in the most valid BI and climate keys obtained in the item analyses of the art sample and the combined art and non-art SF samples. The discussion is separated into four sections: (1) BI items for predicting performance in the arts, (2) climate items related to performance in the arts, (3) BI items for predicting art versus non-art, and (4) climate items related to art versus non-art.

BI Items for Predicting Performance in the Arts

The BI items included in this discussion were selected from the most valid BI items (1-199, 218, and 252-300) in the creativity checklist mean key (key 15T). In the item analysis of the art sample, this key was the most effective overall BI key in predicting the performance criteria in the arts. The items were selected for discussion on the basis of two or more significantly keying item alternatives (.05 or beyond) with the creativity checklist mean criterion, and a significant eta coefficient for the item with the creativity checklist mean criterion. The BI items will be presented in reference to the item alternatives that were chosen significantly more often by higher, or lower, rated art students depending upon the sign of the correlation between the item alternatives and the criterion.

The students who reported their fathers had received graduate training in a college or university were above average in artistic performance, while a larger proportion of the lower rated art students had fathers who had not graduated from high school. No significant differences were found between lower and higher rated art students for the education level of their mothers. Higher rated art students read more literary classics than lower rated students, while the opposite was true for novels and mystery stories. Higher rated art students described themselves as being somewhat above average in responsibility and dependability and were more frequently elected to class or school offices than lower rated students. The lower rated art students predominated on the response--they want to become a skillful user of practical knowledge--while the higher rated art students were more interested in developing their intellectual capabilities.

The lower rated art students reported that they were average (in comparison to other students) in the amount of artistic and academic work they completed and the speed in which their work was done. In contrast, the higher rated art students described themselves as outstanding in speed and completion of artistic and academic work. The students who responded that they wished only to graduate from high school or attend a few years of college, were among the less successful, however, the responses concerning graduating from college or obtaining graduate training did not differentiate. The higher rated art students felt that personal interests and hobbies had interferred with their social life and school work to a great extent, while the lower rated art students reported such interference to only a small extent.

The higher rated art students responses indicated that they applied themselves to a greater extent in practicing in their art area than did those with lower ratings. Art students who responded that they had only an average desire to learn the basic techniques in their area of artistic interest tended to be lower rated. The higher rated students reported that they had an extremely high desire to learn basic techniques. They also indicated that they began to practice and take lessons in an art area prior to age 5 or 6, while the lower rated art students did not begin until they were 11 or older. Finally, the higher rated art students felt their art teachers would describe them as hard workers, while the lower rated art students felt their art teachers would describe them as working only hard enough to get by.

Climate Items Related to Performance in the Arts

The climate items (200-217 and 219-251) were selected from the most valid climate items in the motivation rating key (2C) and the creativity checklist key (4C). These two climate keys had the highest overall cross validities with the art performance criteria in the item analysis of the climate items on the art sample. All climate items discussed in this section of the report had at least two significantly keying alternatives (.05 or beyond) with either the motivation rating or the creativity checklist mean, and a significant eta coefficient with at least one of these criteria. The climate items are reported in terms of the responses of higher rated versus lower rated art students.

The higher rated art students generally had no trouble adapting to the rules and regulations of their school at the time of entrance, while those with lower ratings had some trouble at first but had later adapted. The lower rated art students more frequently described their administration as "always" or "usually" lacking understanding of the problems of students. The higher rated art students felt their schools lacked adequate facilities, i.e., physical space, equipment, etc., for their art area, while the lower rated art students were only sometimes aware of such a deficiency. The lower rated art students indicated their artistic teachers "usually" treated them fairly, rather than "always" or "rarely", while the higher rated art students responded that they were always treated fairly.

Those students with high ratings felt that their opinions and ideas were frequently respected by their favorite teachers, while the lower rated art students felt their opinions only occasionally were held in such respect. The higher rated art students felt the technical competence of their artistic teachers was outstanding, while the lower rated art students described it as very good. A very significant difference between the higher and lower rated art students was obtained on a climate question concerning the degree to which a student participated with his artistic teacher in planning an artistic program. The item had five alternatives ranging from "full participation" to "no participation." The higher rated art students significantly selected the full participation alternative, while the lower rated students significantly selected the no participation alternative.

Another climate item on which the responses of the higher and lower rated art students were very different concerned a rating of training in the students' present school in terms of preparation for future artistic endeavors. The higher rated art students reported their present preparation was outstanding, while the lower rated art students described the preparation as adequate. The outstanding and adequate alternatives were separated by alternatives for "excellent" and "good". Finally, the higher rated art students felt that they received adequate recognition for their work from their artistic teachers a great extent of the time. In contrast, those rated lower felt they received recognition less often.

BI Items for Predicting Art Versus Non-Art

In predicting the art versus non-art criterion in the second item analysis, the BI items common to the art and non-art SF samples (items 1 through 199--general BI items) comprised the predictor data on which the average cross validity of .67 was obtained. A discussion follows of the biographical items that most significantly predicted the art versus non-art criterion in both cross validation analyses with two or more significantly keying item alternatives and significant eta coefficients with art versus non-art criterion.

The art students described themselves as having visited museums, symphonies, plays, etc., occasionally or frequently prior to the age of 12, while non-art students had visited the above locations or functions only rarely or never prior to the age of 12. The mothers of the art students possessed outstanding or excellent artistic talent, while mothers of the non-art students were described as average or somewhat below average in artistic talent. A similar pattern of responses was found for father's artistic talent. The non-art students selected popular and soul music to listen to for personal enjoyment. However, the art students selected jazz and classical as their more preferred types of music. The non-art students more frequently responded that they were interested in developing skills in the use of knowledge or obtaining wealth and power in their life, while the art students were more concerned with developing creatively. Art and non-art students were not differentiated significantly in terms of developing intellectual characteristics.

Performing before an audience was described as very enjoyable by the art students, while the non-art students derived very little or no enjoyment from such performing. In reference to future occupational fields, the non-art students had significantly higher proportions selecting business and finance, science, engineering and medicine, while art students were proportionately higher for the arts and humanities alternative only. Art students reported that they felt it was extremely important for them to be creative. On the other hand, the non-art students felt that it was only somewhat important for them to be creative. In daily working situations, the art students depicted self-expression as being most important to them, while the non-art students selected security and profit. An interesting pattern of responses evolved from an item concerning confidence in intellectual and artistic abilities. The art students reported that they were very or quite confident in both areas of endeavor, however, the

non-art students described themselves as quite confident intellectually but not artistically. Finally, the non-art students indicated that they enjoyed a western movie, bowling or just sitting around with friends, while the art students selected a ballet or an opera for entertainment.

Climate Items Related to Art Versus Non-Art

The climate items common to the art and non-art SF samples (items 200 through 217--general climate items) were also item analyzed against the art versus non-art criterion, although cross validities were not computed due to the small number of items entering into the analysis. The climate items that significantly predicted the art versus non-art criterion in both item analyses with one or more significantly keying item alternatives and significant eta coefficients with the art versus non-art criterion are discussed below.

According to the above criteria for ascertaining significantly keying items, 6 of the 18 climate items could be employed to describe the differences between the art and non-art students in their perceptions of school climate. The students in the arts were significantly different from the non-art students in their responses to an item concerning the extent to which faculty (art and non-art) treated students as responsible, capable people. While the non-art students felt that students were treated as being responsible only to some extent, the art students felt they received such treatment more often. The art students indicated that they presently had a great or considerable opportunity to do new and original work, while the non-art students rated their opportunity to do creative work as seldom or occasional. A significantly larger proportion of art students felt that their school was more strict than other secondary schools in terms of rules, social regulations, and appearance regulations. This was most likely a function of the students at Art School A who lived on campus, and were therefore subject to a wider range of regulations. This apparently was not the case at Art School B.

The art students felt that their schools should be more oriented toward current trends in the arts. However, the non-art students responded that their schools did not need to be more oriented toward current trends in either the arts or social standards, dress, etc. The non-art students felt that their schools were "good" in terms of preparation for future academic endeavors. The art students were not proportionately higher or lower than the non-art students on any of the other responses in this scale, which varied from "really outstanding" to "somewhat less than adequate", with the rating of good in the middle of the continuum. The final general climate item that differentiated art and non-art students was concerned with the degree to which the students felt that the administration dealt with problem situations directly and fairly. The art students felt that the administration "almost always" provided fair treatment, while the non-art students responded that the treatment was "generally fair." No differences existed between art and non-art students on responses concerned with seldom or rare receipt of fair treatment. It was interesting that only 12% of the total number of art and non-art students selected these two alternatives to describe their administration.

CHAPTER VI - DISCUSSION

I: examining the relationships among the performance criteria, the ratings across art areas and checklist measures within art areas were generally moderate to high. The three ratings designed to measure components of creativity across art areas, i.e., sensitivity, motivation and expression of self were highly intercorrelated, and all three of these measures were substantially related to the potential rating. These results indicated that the ratings were not measuring independent dimensions of creativity and the three creativity component criteria were important in assessments of the future potential of the student. The presence of a "halo effect" was also indicated by the high interrelationships of the ratings.

The four ratings correlated rather substantially with the checklist means for the separate art areas of music, visual arts, dance and theater, and with the creativity checklist mean. While a halo effect was likely a contributing factor in the magnitude of these correlations, it was apparent that the four general ratings across art areas were pertinent measures of artistic performance within each of the four art areas for which checklist information was available. Further, the high correlations between the three creativity component criteria and the creativity checklist mean substantiated the assumption that the creativity component criteria were actually measuring dimensions of creativity. This was predicated upon the fact that the items comprising the creativity checklist were creativity construct items employed in previous research to assess the creative performance of scientists and engineers. Factor analyses of these creativity items in the previous investigations have demonstrated their presence on general creativity factors, which also included other measures of creativity such as number of publications and patents (Ellison, James and Taylor, 1968; James, 1970).

The correlations between the four ratings and the number of awards criteria were low to moderate, which indicated somewhat different dimensions of performance underlying the ratings and number of awards, as well as the effects of source variance. On the assumption that somewhat different dimensions underlied the different measures, the motivation, expression of self, and potential ratings were each combined with number of awards to obtain three criterion composites. These composites were constructed to obtain more relevant and comprehensive criteria assessing creative performance.

The correlations between the ratings and the peer nominations, chair and major versus minor criteria were also low to moderate. It was again hypothesized that different dimensions of performance and source variance were the major determinants of the relationships; however, generalization was not possible because of the small sample sizes for these criteria. The correlations between the ratings and the art GPA measures were moderate to high, which demonstrated the same source of measurement, i.e., the art faculty. More important, however, these relationships showed that faculty evaluations for grades in art courses were based in part on the dimensions encompassed by the ratings.

The correlations between the ratings and the academic GPA criterion were generally low. This set a pattern that was visible throughout the report, i.e., performance in the arts and performance in academic areas were generally based upon relatively different abilities. An exception to this was the presence of an underlying general motivation construct, which will be discussed later in this section of the report. Finally, the ratings were not generally correlated at significant levels with the art area and school variables. These results indicated no one art area or school received ratings that were higher than the other art areas or schools.

The intercorrelations among the six music checklist items ranged from low to high. These relationships failed to support the assumption that the six measures of ability in music were independent. However, the intercorrelations among the music checklist items were lower on the average than the intercorrelations of checklist items in the visual art, dance and theater checklists. These results indicated the need for future research on the separate music abilities, employing different measures for each ability, to more comprehensively ascertain the presence or lack of independence inherent between the abilities.

The intercorrelations among the art checklist items were moderate to high. A correlation of .71 was obtained between an item for aesthetic quality and an item for creative imagination. This relationship failed to support the hypothesis provided by Beitell (1964) and Kincaid (1964) that these two measures were independent and therefore should be measured separately. Some support for this hypothesis was provided by the correlations between the expression of self rating and the two checklist items, as the creative imagination art checklist item correlated higher with this rating than did the aesthetic quality item. However, the correlation between the aesthetic quality item and the expression of self rating was .78, which did not provide much evidence of independence.

In contrast to the above, the spontaneous-deliberate continuum proposed by Burkhart (1964) and the concept bound-percept bound continuum proposed by Barkan and Hausman were at least somewhat supported in the present study. The visual art checklist item designed to assess a concept bound approach or deliberateness (the initial clear image of project item) correlated only .46 with the creative imagination item assessing a percept bound approach to art or spontaneousness. Further, the clear image of products checklist item correlated only .53 with the expression of self rating, which was well below the correlation of .85 between the same rating and the creative imagination checklist item.

The items in the dance checklist were rather highly intercorrelated. The checklist item on body structure had the lowest pattern of relationship with the other dance checklist items. The dance checklist item assessing desire for composition and arrangement had the highest correlations with the sensitivity and expression of self ratings, which provided further evidence of construct validity in the faculty ratings. The theater checklist items were also generally highly intercorrelated. The understanding of self checklist item had the lowest pattern of correlations with the other checklist items (following the deletion of the theatrical talent item), and although these correlations were significant, only partial support was provided to the assumption that

an actor had to know himself before he could portray others.

The intercorrelations among the overall checklist items, which included the three creativity checklist items, were moderately to highly intercorrelated (excluding the likeability control score item). Information provided by these relationships demonstrated that students rated higher on the creativity checklist items were also leaders, from the viewpoint of the art faculty. The leadership item was concerned with the extent to which each student initiated the activities of other students, and it was apparent that the more creative students also initiated the most activities, at least in the eyes of the faculty. However, the creativity and leadership items were only moderately correlated with an item designed to measure the extent to which a student assisted others in their work (stimulation value). These relationships indicated that although the more creative students often initiated the activities of other students, they did not necessarily assist the other students in their projects.

The peer nomination, chair and major versus minor criteria were available for only one art school, and the sample sizes for these measures were too small to provide an adequate basis for generalizing from their relationships with the other criteria. The self report number of awards measure was found to be correlated with the art area of instrumental music, which meant instrumental music students tended to have more awards than students in other art areas. Since availability of (or probability of attaining) awards was considered to be more prevalent in instrumental music than in the other art areas, the number of awards criteria was standardized by art area to correct for the biasing factor of availability of awards. The corrected measure for number of awards was used in the construction of the criterion composites.

The correlations among the art GPA criteria (both GPA in major areas and GPA in combined major and minor areas), the art area variables, and the school measures were rarely significant and no adjustments were made in these variables. The same pattern characterized the correlations among all of the performance criteria and the control measures for likeability, age, grade and sex which were either not significant or significant but very low. The correlations between the performance measures and the experience control variable were generally higher than those between the performance measures and the above control variables; however, these correlations were still quite small. Therefore, the performance criteria did not require correction for any type of contaminating effects which might have been contributed by the control scores.

The item analysis of the biographical (BI) items for the art sample to predict performance in the arts resulted in highly significant predictions for the performance criteria both across areas of arts and within each area of the arts. The highest cross validities obtained for predicting the four ratings ranged from .40 for the expression of self rating to .49 for the potential rating. These cross validities represented a rather high degree of prediction as cross validities above .40 are relatively rare in any type of cross validation investigation (Ghiselli, 1955). This same pattern of significant cross validities

was generally obtained for predicting success in each of the four art areas, based on selected checklist items for each of the art areas. The aesthetic quality visual art checklist item was predicted at the .50 level, while the visual art checklist mean was predicted at the .48 level. The music checklist mean was predicted at the .34 level, which was the lowest cross validity obtained for predicting the different art area checklist means. The dance checklist mean was predicted at the .44 level while the theater checklist mean was predicted at the .38 level. Further, the composition and arrangement dance checklist item was predicted at the .42 level, while the theater checklist item for ability to concentrate and make a part believable was predicted at the .54 level.

The creativity checklist mean was predicted at the .32 level by the BI key constructed to predict this criterion across all BI items; however, the importance of this criterion was demonstrated by the effectiveness of the BI keys (across BI subscores) constructed to predict it. The creativity checklist keys, especially the key based upon the art BI items, were, overall, the most valid keys in the analysis of the biographical data for the art sample.

These results on the criterion intercorrelations and the cross validities within and across art areas indicate that studies of artistic talent can be carried out in terms of common characteristics, both criteria and predictors, across areas of artistic endeavor. This is not to imply that studies of differences between musicians and visual artists, etc., would not be constructive and important as a series of such studies should also lead to a better understanding of career development in the arts.

The peer nomination criteria and the art GPA criteria were generally predicted with validities ranging from .22 to .39, which were not generally as substantial as those received for the ratings and a number of the art area checklist criteria. The corrected self report number of awards criterion was also predicted at about the same level (.39), but again this cross validity was not as high as those obtained for the ratings. The composite criterion measures were predicted at substantial levels, generally higher than any of the other performance criterion measures. The motivation rating and number of awards composite was predicted at the .53 level, the expression of self and number of awards composite was predicted at the .49 level, and the potential rating and number of awards composite was predicted with an unusual cross validity of .57. These cross validities provided strong evidence for the beneficial effects obtained from combining relevant criteria of performance from a general creativity domain. On the basis of the above results, it was possible to conclude that biographical data were generally highly efficient in predicting performance criteria both across areas of the arts and within the different major areas of the arts; although, predictive validation investigations should certainly be conducted for conclusive evidence. The BI keys that were most successful in predicting the performance criteria in the present study were those keys either constructed on the art BI items or art and general BI items combined. However, the general BI keys also generally predicted the performance criteria at significant levels. These results demonstrated that while BI items specially

designed for art students were quite predictive of performance, the general BI items, many of which were constructed originally for prediction of creativity in science and engineering, were also related to success in the arts. This provided further evidence that success in the sciences and engineering and success in the arts were in part related to a common set of biographical characteristics.

The a priori IBRIC Creativity Key had a number of significant cross validities with the art performance criteria. Since this key was constructed to predict creativity in science and engineering in previous research, the above assumption of the existence of some common biographical characteristics between success in scientific and engineering areas and success in art was further substantiated. The a priori Academic Performance Key predicted the academic GPA criterion for the art students at the .67 level. This was the highest cross validity obtained for predicting the academic GPA criterion in the present study. The Academic Performance Key also predicted the motivation rating, clear image of products art checklist item, the visual art checklist mean, and the two art GPA measures at moderate (.40's) levels. These cross validities were assumed to be reflecting a general motivation construct underlying some of the criteria, which was generally convergent in nature and operative regardless of type of endeavor, i.e., art or academic areas.

The correlations between the BI keys constructed to predict performance in the arts and the art area and school variables were all quite low; although, some interesting patterns of relationships existed. The students in the visual arts had a slight tendency to have lower scores on the BI keys, while the music (instrument) students had a slight tendency to have higher scores. The students attending the two art schools had a tendency to have higher scores on the BI keys than the students attending the two high schools. The latter pattern of correlations was a function of the fact that the two art schools selected students on the basis of artistic ability. The correlations between the BI keys and the control measures were either low or not significant, which demonstrated the absence of any contaminating effects of the control scores on the BI keys.

The analysis of the climate items on the art sample demonstrated that the climate keys were generally moderate in their relationships with the ratings, the visual art criteria, the art GPA criteria, and the composite criteria. For example, the motivation rating was predicted at the .35 level, the art checklist item for aesthetic quality was predicted at the .49 level, the visual art checklist mean was predicted at the .46 level, the GPA in major art area was predicted at the .38 level, and the potential rating and number of awards composite was predicted at the .41 level. However, the climate keys were not generally effective in significantly predicting the checklist criteria for the music, dance, and theater areas. Further, the cross validities for the climate keys, against the performance criteria, were lower than the cross validities obtained for the BI keys against the same criteria. This was partially a function of the fact that only a relatively small number of climate items were included in the BI for exploratory purposes. However, the fact that the highly valid section of art BI items (items 252 through 300)

encompassed approximately the same number of items as the climate section of the BI indicated that biographical data were better predictors of artistic performance than climate data. On the other hand, the two types of data would usually be employed for different purposes, i.e., biographical data for selection and placement purposes and climate data for the understanding of the influences of the organization on the performance of individuals after they have been selected and placed into the organization. Therefore, the predictive effectiveness of the climate items in the present study indicated the importance of this type of information, and the need for more comprehensive climate studies in the arts.

The students in the art sample were generally above average on the standardized academic achievement tests. The academic achievement tests were generally poor and nonsignificant in their predictions of the art performance criteria. As discussed previously, it appeared that success in the arts was not related to intellectual and academic abilities. However, conclusions based upon the validities of the standardized academic achievement tests against the artistic criteria were only tentative due to generally small sample sizes for the tests. Finally, the correlations between the academic achievement test scores and the art area variables revealed that the visual art students tended to perform less well on the tests than students in other art areas, while the music (instrument) students had a tendency to score higher. However, these correlations were not high and indicated only tendencies for samples with an N of less than 100.

The correlations between the academic achievement tests, the BI keys, and the climate keys on the art sample provided little new information beyond that already discussed. The correlations between the academic tests and the BI and climate keys constructed to predict artistic performance were generally low or moderate, which again indicated the difference in dimensions of performance underlying achievement in the arts and academics. These results argue for a wider variety of assessment devices so that individual talents can be identified and developed more effectively. The correlations between the BI keys and the climate keys were generally moderate. This was expected because the two sets of keys were constructed to predict the same criteria (which were also correlated). However, the need for future climate studies in the arts was apparent because a sizable portion of the variance in the climate keys was independent of the BI keys.

The item analysis of the combined art and non-art SF samples was designed to predict the art versus non-art dichotomous criterion and highly successful results were obtained with an average cross validity of .67. These results were approximately the same as those obtained by Schaefer and Anastasi (1968) and Anastasi and Schaefer (1969) in predicting an art versus non-art criterion on adolescent boys and girls. However, in the present study the predictive effectiveness of the art versus non-art BI key against criteria of artistic performance was assessed for the sample of art students. The results showed that while the art versus non-art BI key was generally valid for predicting performance in the arts, it was not as effective in predicting artistic performance as the BI keys developed empirically to predict the art

criteria. Therefore, these results indicate that the art versus non-art BI key should not be used in lieu of empirically developed BI keys in the prediction of performance in the arts.

Separate analyses were conducted to determine the extent to which the BI keys developed to predict performance in the arts on the total art sample differentiated between art and non-art SF students, the art and non-art LF students, and the non-art SF and non-art LF students. Prior to these analyses however, descriptive data for the three samples were examined. This examination showed that the three samples were highly comparable on mean academic GPA and grade level. The two non-art samples were comprised of more males, and students from Art School B were more numerous in the non-art LF sample.

The comparison of mean BI keyscores for the art and the non-art SF samples demonstrated that students in the art sample scored significantly higher than students in the non-art SF sample on the BI keys constructed on items 1 through 199 (general BI items) to predict the artistic performance criteria. The art students also had significantly higher scores on the IBRIC Creativity Key. These results demonstrated that the BI keys constructed to predict performance criteria in the arts and a BI key constructed to predict performance in scientists and engineers successfully differentiated between art and non-art students. However, estimates of the predictive powers of the above BI keys showed that they were not as efficient as the art versus non-art BI key, constructed in the second item analysis, in differentiating between the art and non-art SF samples. This presented an interesting paradox in that the BI keys constructed to predict artistic performances were generally more valid in predicting these performances than the art versus non-art BI key, while the art versus non-art BI key was more valid than the BI performance keys in predicting the art versus non-art criterion.[8] However, as discussed previously, the prediction of actual performance would be the more relevant goal in selection and placement, and, therefore, the BI keys constructed to predict performance in the arts would be most effective for these purposes.

The comparisons of mean BI keyscores for the art sample versus the non-art LF sample on the BI keys constructed on the first 199 items of the BI (general BI items) to predict performance criteria showed that these BI keys were not particularly efficient in differentiating between these two samples. The art sample BI keyscore means were significantly higher than the non-art LF sample BI keyscore means in three out of five cases; however, the non-art LF sample was significantly higher than the art sample on the combined major and minor art GPA key. The BI keys did not differentiate between those two samples effectively. It was, therefore, apparent that the non-art LF sample was much more similar to the art sample, in terms of biographical characteristics, than was the

---

[8] The comparisons of mean BI keyscores were based upon keys constructed to predict performance in the arts on the total art sample. The validity of these keys was assumed to be at least equal to that of the keys constructed to predict the same criteria in the cross validation analysis of the art samples.

non-art SF sample. This was an expected result because students in the non-art LF sample had sufficient experience in the arts to complete the art sections of the BI, even though they did not appear to be interested in the arts according to school records. The high concentration of Art School B academic students in the non-art LF sample was also a likely contribution to the above results.

The fact that the non-art LF students were more similar to the art students than were the non-art SF students was further substantiated by the comparisons of mean BI keyscores for the non-art LF sample and the non-art SF sample. The BI keys constructed to predict artistic criteria on the general BI items (1 through 199) were also employed for these comparisons. The BI means for the non-art LF sample were significantly higher than the means for the non-art sample in every comparison. The estimated effectiveness of the BI keys in differentiating between the two samples was generally moderate.

On the basis of the above three analyses of the mean BI keyscores, i.e., art versus non-art SF and art versus non-art LF, non-art SF versus non-art LF, on keys constructed to predict performance in the arts, it was apparent that the non-art LF sample occupied somewhat of a middle ground between the art sample and the non-art SF sample. However, the above analyses were based upon keys constructed on the general BI items (1 through 199). A further analysis of the art versus non-art LF sample on BI keys constructed on the art BI items (252 through 300) to predict performance in the arts provided somewhat different results. The BI mean keyscores for the art sample were substantially higher than the mean BI keyscores for the non-art LF sample on the BI keys constructed on art items. The estimated predictive efficiency of the BI keys in differentiating between the art sample and the non-art LF sample modes ranged between .34 and .38. These results suggested that the non-art LF students were not as proficient in the arts as the students in the art sample. However, this suggestion could only be tentative because the students in the art sample had twice as much experience as the students in the non-art LF sample.

An examination of the "highest keyed" items in the most valid BI and climate keys obtained in the item analyses of the art sample and the combined art versus non-art SF samples provided information on the biographical and climate characteristics that most successfully differentiated between higher and lower art students, and art versus non-art students. In reference to biographical characteristics which differentiated between higher rated and lower rated art students, the higher rated students were more intellectually stimulated and mature as they had fathers who received more graduate training in a college or university, read more literary classics, were above average in responsibility and dependability, were elected to more class or school offices, etc. The lower rated art students, in comparison had a more practical orientation and seemed more involved in other cultural activities as they read more novels and mystery stories, were less frequently elected to class and school offices, and were more interested in becoming skillful users of practical knowledge.

The climate items which differentiated between higher rated art students and lower rated art students indicated that higher rated students were more aware of the advantages and limitations in their school as they felt their schools lacked adequate facilities for their art area, but they were always treated fairly by their art teachers who were outstanding. In addition, the higher rated students indicated that they participated fully with their art teachers in planning an artistic program and they recieved adequate recognition of their work. In contrast, the lower rated art students were less aware of deficiencies in their school facilities and generally had less respect for, and involvement with, their teachers. A challenge for future research studies dealing with climate in art schools will be to examine the extent to which these kinds of data are a reflection of reality or whether changes in such variables could bring about more effective performances for all students.

The BI items which differentiated between the art and non-art students revealed that art students were exposed more to the arts and were more aware and informed concerning possible career choices as they visited museums, symphonies, plays, etc., occasionally or frequently prior to the age of 12, had parents who possessed outstanding or excellent artistic talent, preferred jazz and classical types of music and desired occupations in the arts and humanities. In contrast, the non-art students visited museums, symphonies, plays, etc., less often and generally had less exposure to and awareness of the arts. In addition, they felt it was only somewhat important to be creative, and that security and profit were most important to them in daily working situations.

The climate items which differentiated between the art and non-art students were based upon general climate items only and followed the pattern previously presented as art students felt that they were treated as responsible individuals by the faculty more often and they presently had considerable opportunities to be creative. In contrast, the non-art students responded that they were treated in a less mature manner and only seldom or occasionally had opportunities to do new and original work.

Proposed future research endeavors include obtaining predictive validities for the BI keys constructed to predict performance in the arts; more extensive criterion development for the separate art areas; more extensive investigations of the similarities and differences between students in the separate art areas in terms of criteria, biographical data and climate information; expanded climate studies in the arts using a broader and more extensive climate inventory; the construction of new BI items to increase prediction for criteria in music; and investigation on adults in the arts.

CHAPTER VII - SUMMARY

This study was concerned with an investigation of artistic talent measures, the identification of artistic talent, and an examination of the relationship of organizational characteristics to artistic performance. The predictor instrument used was a specially constructed questionnaire made up of multiple choice biographical items and selected climate items. The sample included 501 tenth through twelfth grade students in the arts and 479 tenth through twelfth grade students who were classified as non-art through reviews of school records. The sample of students in the arts (art sample) was obtained from two schools specializing in the arts (Interlochen Arts Academy, Interlochen, Michigan, and the Governor's School, Winston-Salem, North Carolina) and two high schools in the Salt Lake City, Utah area. The sample of non-art students was comprised of students enrolled in academic areas at one of the art schools and students who had not electively selected courses in the arts at the two high schools.

The goals of the study were: to investigate the relationships of artistic performance through correlations of multiple criteria of artistic success; to construct valid empirical scoring procedures (keys) for a Biographical Inventory (BI) and an exploratory section of climate items to predict performance in the arts both across areas of the arts and within the major art areas of music, visual arts, dance and theater; to compare the predictive effectiveness of the above empirically constructed BI and climate keys with that of an a priori academic BI key, a scientific and engineering creativity BI key, and standardized academic achievement tests; and to evaluate the effectiveness of the empirically developed BI and climate keys in differentiating between art and non-art students.

The study was carried out by collecting BI, climate, and performance data on the students in the art sample. A 300 item questionnaire was employed to obtain the BI and climate information. The questionnaire was also administered to the students in the non-art sample; however, the non-art students were to complete only the first 218 items of the questionnaire. This was due to the fact that the first 218 items contained a section of general BI items (1 through 199), a section of general climate items (200 through 217), and a BI item (218) concerning interest in the arts. If a student had little interest and experience in the arts, he was instructed to terminate with item 218 since the remaining items in the questionnaire concerned climate items specific to the arts (219 through 251) and BI items specific to the arts (252 through 300). It was expected that all non-art students would terminate with item 218; however, 167 out of the 479 non-art students completed the remainder of the form, which indicated that these students had sufficient experiences in the arts outside of school to answer the art items. The non-art sample was therefore divided into a non-art SF sample (students who completed only 218 items) and the non-art LF sample (students who completed the total questionnaire).

A criterion intercorrelation analysis on the multiple criteria of performance for the art sample indicated that a number of dimensions

of ability were necessary for performance in the arts, and that these dimensions were not generally related to academic abilities as measured by academic Grade-Point-Average (GPA). The multiple criteria of performance included faculty ratings for sensitivity, motivation, expression of self, and potential; checklist ratings provided by faculty on major performance components for the separate art areas of music, visual arts, dance and theater; a creativity checklist provided from previous research on scientists and engineers; art and academic GPA measures; and a self-report measure for number of awards received in the arts. Information on area of artistic endeavor and school was also included in the analysis. Nonsignificant or low correlations between control variables, i.e., age, grade, sex and likeability, and the criteria indicated the absence of contaminating effects on the criterion measures.

An item analysis was conducted on the art sample, in a double cross validation design, to develop scoring keys for the BI items and climate items to predict performance in the arts. Empirical scoring keys were constructed for each section of the BI (general BI items and art BI items) as well as for all BI items. The cross validities obtained for the BI keys in predicting the art performance criteria demonstrated that the BI could successfully predict performance in the arts both across and within art areas. The cross validities for the BI keys were in the .40's for the ratings, as high as the .50's for some of the separate checklist items, and generally in the .50's for criterion composites based on combinations of ratings and number of awards standardized by art area. The BI keys based on the art BI items and all BI items were the most valid keys; however, keys based on the general BI items were also valid against the art criteria. The a priori BI key for predicting academic achievement was extremely predictive of academic GPA (.67), and was also valid for a number of the art performance criteria which generally had an underlying motivation construct. The a priori key constructed on scientists and engineers to predict creativity had some significant validities with the performance criteria in art. The indication was thus provided that a set of common biographical characteristics underly performance in both the art and the scientific and engineering areas.

Scoring keys constructed on the exploratory climate data for the art sample were shown to be related to artistic performance, although the cross validities for the climate data were lower than those received for the BI data. However, a strong indication existed that future research on the relationship between climate information and artistic performance would provide higher validities if a more extensive climate inventory was used. Finally, an examination of the validities for the standardized academic achievement tests against the art criteria demonstrated that these tests were generally not predictive of performance in the arts.

An item analysis conducted on the combined art and non-art SF samples on the general BI items to predict an art versus non-art criterion demonstrated the BI was highly successful in differentiating between these art and non-art students. The average cross validity for the art versus non-art key, constructed in the above analysis, was .67

against the art versus non-art criterion. The predictive effectiveness of the art versus non-art key in predicting the performance criteria for the art sample was also ascertained. It was found that this key was generally not as effective as the empirically developed BI keys for predicting performance in the arts.

Following the cross validation analyses, a total sample item analysis was conducted on the BI items for the art sample in order to construct the most stable keys for predicting artistic criteria on the available data. These BI keys were then used to score the art sample, the non-art SF sample and the non-art LF sample. The mean keyscores for each of the three samples were then compared with the mean keyscores of the other two samples in order to determine the degree to which BI keys constructed to predict performance in the arts differentiated between the art sample and the two non-art samples. The results of the mean keyscore comparisons provided the information that students in the art sample were significantly different from students in the non-art SF sample in reference to biographical characteristics, and that students in the non-art LF sample occupied a "middle ground" between art students and true non-art students. Finally, a separate section of the report presented comparisons between more and less successful students in the arts in terms of differential biographical characteristics and perceptions of climate. Also included in this chapter were comparisons between art and non-art SF students on biographical and climate data.

Overall results indicated that biographical and climate data could make a significant contribution to the identification and development of artistic talent. Further research is warranted on the life history correlates of talent as well as the organizational characteristics which facilitate or inhibit its development within and across fields of endeavor, especially the arts and sciences, as well as longitudinal studies and criterion investigations.

REFERENCES

1. Albright, L. E., and Glennon, J. R. Personal history correlates of physical scientists' career aspirations. Journal of Applied Psychology, 1961, 45, 281-284.

2. Anastasi, A. Psychological Testing. New York: The Macmillan Co., 1961.

3. Anastasi, A., and Schaefer, C. E. Biographical correlates of artistic and literary creativity in adolescent girls. Journal of Applied Psychology, 1969, 53, 267-273.

4. Barkan, M., and Hausman, J. Two pilot studies with the purpose of clarifying hypotheses for research into creative behavior. Research in Art Education. National Art Education Association, 7th Yearbook, 1956, 126-141.

5. Beittel, K. R. The creativity complex in the visual arts. Studies in Art Education, 1959, 1, 26-37.

6. Beittel, K. R. (Ed.) Creativity, education, and art: Interpretations. Research issue, Eastern Arts Association Bulletin, 1961, 18 (4).

7. Beittel, K. R. Creativity in the visual arts in higher education: criteria, predictors, experimentation, and their interactions. In Widening Horizons in Creativity, Taylor (Ed.), New York: John Wiley and Sons, 1964.

8. Brittain, W. L. Experiments for a possible test to determine some aspects of creativity in the visual arts. Unpublished doctoral dissertation, The Pennsylvania State University, 1952.

9. Burkhart, R. C. Spontaneity and deliberateness as a creativity personality continuum. Studies in Art Education, 1960, 2 (1).

10. Burkhart, R. C. Spontaneous and Deliberate Ways of Learning. Scranton, Pa.: International Textbook Co., 1962.

11. Chambers, J. A. Creative Scientists of today. Science, 1964, 145, 1203-1205.

12. Child, I. L. Observations on the meaning of some measures of esthetic sensitivity. Journal of Psychology, 1964, 57, 49-64.

13. Dunnette, M. D. A note on the criterion. Journal of Applied Psychology, 1963, 47, 251-254.

14. Eisner, E. W. A typology of creativity in the visual arts. In Brittain, W. L. (Ed.). Creativity and Art Education, Washington, D. C.: The National Art Education Association, 1964, 127-138.

15. Ellison, R. L. The relationship of certain biographical information to success in science. Unpublished master of arts thesis, University of Utah, 1960.

16. Ellison, R. L., James, L. R., and Carron, T. The prediction of scientific performance criteria with biographical information. Report submitted to Ethyl Corporation, Institute for Behavioral Research in Creativity (IBRIC), Salt Lake City, Utah, 1968.

17. Ellison, R. L., James, L. R., Fox, D. G., and Taylor, C. W. The analysis and prediction of Dow scientific performance. Report submitted to Dow Chemical Company, Institute for Behavioral Research in Creativity (IBRIC), Salt Lake City, Utah, 1968.

18. Ellison, R. L., James, L. R., McDonald, B. W., and Taylor, C. W. The prediction of scientific and engineering performance with biographical information. Report submitted to North American Rockwell, Inc., Institute for Behavioral Research in Creativity (IBRIC), Salt Lake City, Utah, 1968.

19. Ellison, R. L., McDonald, B. W., James, L. R., Fox, D. G., and Taylor, C. W. An Investigation of Organizational Climate. Greensboro, North Carolina: Richardson Foundation, 1968.

20. Ghiselin, B. In Widening Horizons in Creativity, Taylor (Ed.), New York: John Wiley and Sons, 1964, 228.

21. Ghiselli, E. E. The Measurement of Occupational Aptitude. Berkeley: University of California Press, 1955.

22. Guilford, J. P. Progress in the discovery of intellectual factors. In Widening Horizons in Creativity, Taylor (Ed.), New York: John Wiley and Sons, 1964.

23. Guion, R. M. Criterion measurement and personnel judgments. Personnel Psychology, 1961, 14, 141-149.

24. Henry, E. R. Research conference on the use of autobiographical data as psychological predictors. Greensboro, North Carolina: Richardson Foundation, 1965.

25. IBRIC. The ALPHA Biographical Inventory. Prediction Press, Greensboro, North Carolina, 1968.

26. James, L. R. The development of criterion composites for creativity. Unpublished doctoral dissertation, University of Utah, 1970.

27. Kincaid, C. E. The determination and description of various creative attributes of children. In Brittain, W. L. (Ed.), Creativity and Art Education, Washington, D. C.: The National Art Education Association, 1964, 108-115.

28. Kulberg, G. E., and Owens, W. A. Some life history antecedents of engineering interests. Journal of Educational Psychology, 1960, 51, 26.

29. Lacklen, R. In Widening Horizons in Creativity, Taylor, (Ed.), New York: John Wiley and Sons, 1964.

30. Lowenfeld, V. Educational implications for creativity research in the arts. Unpublished manuscript, University of Utah, 1957.

31. Lowenfeld, V., and Beittel, K. R. Interdisciplinary criteria of creativity in the arts and sciences: a progress report. Research in Art Education, 9th Yearbook of the NAEA, 1959, 35-44.

32. McDermid, C. D. Some correlates of creativity in engineering personnel. Journal of Applied Psychology, 1965, 49, 14-19.

33. Mednick, S. A., and Mednick, Martha T. An associative interpretation of the creative process. In Widening Horizons in Creativity, Taylor (Ed.), New York: John Wiley and Sons, 1964.

34. Owens, W. A., Albright, L. E., and Glennon, J. R. Retest consistency and the writing of life history items--a first step. Journal of Applied Psychology, 1962, 46, 329-332.

35. Robertson, L. R. Creativity in music. Unpublished manuscript, Salt Lake City, Utah, 1969.

36. Rusch, C. W. On the use of leveling and sharpening as an analytic tool in the study of artistic behavior. Reprint from the proceedings, 77th Annual APA Convention, 1969.

37. Schaefer, C. E., and Anastasi, A. A biographical inventory for identifying creativity in adolescent boys. Journal of Applied Psychology, 1968, 52, 42-48.

38. Skager, R. W., Schultz, C. B., and Klein, S. P. Points of view about preference as tools in the analysis of creative products. Perceptual and Motor Skills, 1966, 22, 83-94.

39. Smith, W. J., Albright, L. E., and Glennon, J. R. The prediction of research competence and creativity from personal history. Journal of Applied Psychology, 1961, 45, 59-62.

40. Taylor, C. W. Research findings on creative characteristics. In Brittain, W. L. (Ed.), Creativity and Art Education, Washington, D. C.: The National Art Education Association, 1964, 27-34.

41. Taylor, C. W. (Ed.). Climate for creativity. In press, University of Utah, Salt Lake City, Utah.

42. Taylor, C. W., and Ellison, R. L. Predicting creative performances from multiple measures. In Widening Horizons in Creativity, Taylor (Ed.)., New York: John Wiley and Sons, 1964.

43. Taylor, C. W., and Ellison, R. L. Predictors of scientific performance. Science, 1967, 155, 1075-1079.

44. Taylor, C. W., Ghiselin, B., and Yagi, K. Exploratory research on communication abilities and creative abilities. Air Force Office of Scientific Research, AF-AFOSR-144-63, U.S. Government Printing Office, 1967.

45. Taylor, C. W., Price, P. B., Richards, J. M., and Jacobsen, T. L. An investigation of the criterion problem for a group of medical general practitioners. Journal of Applied Psychology, 1965, 49, 399-406.

46. Taylor, C. W., Smith, W. R., and Ghiselin, B. The creative and other contributions of one sample of research scientists. Scientific Creativity, Taylor and Barron (Eds.), New York: John Wiley and Sons, 1963.

47. Taylor, C. W., Smith, W. R., Ghiselin, B., and Ellison, R. L. Explorations in the Measurement and Prediction of Contributions of one Sample of Scientists. Publ. USAF, AFSC Personnel Laboratory, Lackland AFB, ASD-TR-61-96, 1961.

APPENDIX A

RATING FORMS FOR STUDENTS

For Research Purposes Only

Introduction: This packet of materials includes description artistic performance together with some specific questions describing purpose of these forms is to evaluate the students who are completing mation will be kept strictly confidential and will be used for researc cessed entirely at the Institute for Behavioral Research in Creativity in terms of relationships found on the total group, without any refere their names. In order to become familiar with the procedures, please rating forms before you begin to rate.

Explanation of the Rating Forms: As you open this booklet, for the names of the individuals you are rating. Down the center of mance are described. Notice that these descriptions occur at even po being the lowest and 15 the highest. The odd numbers between the sta between the two adjacent statements. These odd numbers can be used t statement a student's performance tends to be. They also can be used students who receive the same rating so that you can reduce the numbe

The percentages down the left hand side of each rating scale students could be distributed across the rating scales. These percent make your evaluations.

On the back of the rating scales, various sets of checklist separate sets of checklist items pertain to the four artistic areas o complete only the one checklist for your own particular artistic area in Music, complete only the MUSIC CHECKLIST and disregard the Art, Dan not in one of these four artistic areas, disregard the first four che

The fifth checklist, the OVERALL CHECKLIST EVALUATION, is a Please complete this checklist for all students regardless of artistic

Instructions for Completing the Forms: The following four s forms:

1. On each rating scale, read all of the seven descriptive first student on the list. Select the number from the scale which bes student and write this number within the parentheses by his/her name. before proceeding to the next page. You may rightly think that no one of the person, but make the best single choice you can.

RATING FORMS FOR STUDENTS

For Research Purposes Only

roduction: This packet of materials includes descriptions of a number of different dimensions of ormance together with some specific questions describing different components of performance. The ese forms is to evaluate the students who are completing the Biographical Inventory. This infor- e kept strictly confidential and will be used for research purposes only. The data will be pro- y at the Institute for Behavioral Research in Creativity, and the results will be reported only elationships found on the total group, without any reference whatever to individual students or In order to become familiar with the procedures, please read the instructions and all of the efore you begin to rate.

lanation of the Rating Forms: As you open this booklet, you will find a space provided on the right of the individuals you are rating. Down the center of the page seven different levels of perfor- cribed. Notice that these descriptions occur at even points along a 15 point scale with number 1 est and 15 the highest. The odd numbers between the statements indicate a position on the scale o adjacent statements. These odd numbers can be used to indicate on which side of a particular tudent's performance tends to be. They also can be used to make distinctions between any two receive the same rating so that you can reduce the number of ties in your ratings on each page.

percentages down the left hand side of each rating scale present a picture of how 100 typical be distributed across the rating scales. These percentages are included as guidelines as you luations.

he back of the rating scales, various sets of checklist items are included. The first four of checklist items pertain to the four artistic areas of Music, Art, Dance and Theater. Please the one checklist for your own particular artistic area. For example, if you are an instructor lete only the MUSIC CHECKLIST and disregard the Art, Dance and Theater checklists. If you are these four artistic areas, disregard the first four checklists altogether.

fifth checklist, the OVERALL CHECKLIST EVALUATION, is a general checklist for all students. e this checklist for all students regardless of artistic area.

tructions for Completing the Forms: The following four steps are required to complete the rating

On each rating scale, read all of the seven descriptive statements thoroughly before rating the on the list. Select the number from the scale which best describes the performance of each ite this number within the parentheses by his/her name. Rate all of the people on each scale ing to the next page. You may rightly think that no one of the statements is an exact description but make the best single choice you can.

2. In your assessments, evaluate each student in comparison to the descri
percentage guidelines, emphasizing demonstrated performance and accomplishments. Po
ments should be considered only in terms of your confidence that the potential will
you have not had a sufficient opportunity to observe a student's performance, write
the parentheses.

3. Select the checklists which pertain to you. This would usually be one
lists and fifth overall checklist. Read each checklist item carefully and record th
which best describes each student in the parentheses listed for that question beside
important that you rate all your people on one particular question before continuing

4. In your evaluations, be certain to remember that:

- Everyone has both strengths and weaknesses; therefore, the us
ratings for a student should reflect a combination of low, ave
ratings. It would be a very rare instance when a student is e
strong or equally weak in all aspects of his/her performance.

- Ties should be reduced by using the odd number between two ad

Remember, the ratings are for research purposes only and results will be
relationships found on the total group, without any reference whatever to individua
so please make your evaluations as accurate as possible.

Thank you for your cooperation.

Name of Rater _____

Department _____

Location _____

your assessments, evaluate each student in comparison to the descriptive statements and the lines, emphasizing demonstrated performance and accomplishments. Potential for future attainment considered only in terms of your confidence that the potential will actually be realized. If a sufficient opportunity to observe a student's performance, write N.O. (No Opportunity) in

lect the checklists which pertain to you. This would usually be one of the first four checklists overall checklist. Read each checklist item carefully and record the letter of the alternative ribes each student in the parentheses listed for that question beside his/her name. It is ou rate all your people on one particular question before continuing on to the next one.

your evaluations, be certain to remember that:

- Everyone has both strengths and weaknesses; therefore, the usual pattern of ratings for a student should reflect a combination of low, average and high ratings. It would be a very rare instance when a student is either equally strong or equally weak in all aspects of his/her performance.

- Ties should be reduced by using the odd number between two adjacent statements.

er, the ratings are for research purposes only and results will be reported in terms of und on the total group, without any reference whatever to individual students or their names, our evaluations as accurate as possible.

you for your cooperation.

Name of Rater _____

Department _____

Location _____

SENSITIVITY

Evaluate each student's degree of sensitivity and awareness in your area of artistic endeavor. Consider demonstrated abilities to recognize significant characteristics of the artistic environment, either in his/her own work or in the work of others, which reflect an openness of perception and an ability to differentiate and select things of artistic merit. Emphasize <u>ONLY</u> demonstrated sensitivity.

Hypothetical breakdown of how a sample of 100 students might be distributed across the descriptive statements.				
5%	10%	20%	30%	10%	5%

1-

s demonstrated very little sensitivity or awareness. ( )

2— ceptions are usually of a stereotyped nature and lack cognition of significant artistic merit. ( )

3- ( )

tes little sensitivity as awareness and openness 4— limited. Only occasionally recognizes things of it. ( )

5- ( )

ssful at recognizing artistic merit. 6— has been limited to similar ( )

7- ( )

mount of sensitivity. 8— rception and recognition ituations or circumstances. ( )

9- ( )

n an average amount of artistic 10— lly differentiate and select things n a number of different situations. ( )

11- ( )

an exceptional ability to openly perceive and 12— significant things in the artistic environment in fferent situations. ( )

13- ( )

extremely sensitive to and aware of the artistic environment. ( )

14— as an extraordinary capability to recognize significant things of artistic merit in numerous situations and circumstances. ( )

15- ( )

(WHEN YOU HAVE RATED EACH STUDENT, TURN THE PAGE.)

Music Checklist

1. Evaluate each student's ability to improvise.

   A. Excellent ability to improvise.
   B. Good improvisation abilities.
   C. Usually has some trouble when attempting to improvise.
   D. Unable to improvise.

2. Describe each student's sense of pitch.

   A. Rather poor sense of pitch.
   B. Possesses some sense of pitch.
   C. Relative pitch.
   D. Absolute pitch.

3. Evaluate each student's sense of rhythm.

   A. Very effective, can coordinate rhythms and establish complex rhythm patterns.
   B. Somewhat effective, can coordinate some rhythms and establish moderately complex rhythm patterns.
   C. Can rarely coordinate rhythms or establish complex rhythm patterns.

4. Which of the following best describes each student's ability to effectively sight read music?

   A. Does not read music.
   B. Very poor ability to sight read.
   C. Effectiveness is somewhat limited in sight reading music.
   D. Good sight reading ability.
   E. Very effective in sight reading music.

5. Indicate the degree to which each student possesses a natural vocal quality.

   A. Excellent natural vocal quality.
   B. Good natural vocal quality.
   C. Has some natural vocal quality.
   D. Has little or no natural vocal quality.

6. Evaluate each student's ability to compose music.

   A. Has demonstrated a high degree of promise as a composer.
   B. Good composition abilities.
   C. Some compositions have been at least adequate.
   D. Has not been very promising as a composer.
   E. Shows no interest in composition.

Checklist Answers for Music

On the page to your left, six items are listed describing various components of performance in music. Consider each item and the alternatives carefully for each student you are rating For each question select the alternative which best describes each student's performance and record the alphabetical letter corresponding to the alternative in the appropriate space beside his/her name. Make the best single choice you can even though no one of the statements within a set fits the student exactly. Rate all your students on one item before continuing on to the next item.

1.	2.	3.	4.	5.	6.
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )

MOTIVATION

Consider each student's degree of motivation in your area of artistic endeavor. Make evaluations on the extent to which the student constantly strives to make full utilization of artistic talent and to excel to the best of his/her ability. Emphasize ONLY demonstrated motivation.

Hypothetical breakdown of how a sample of 100 students might be distributed across the descriptive statements.				
5%	10%	20%	30%	5%

1-		
2—	Limited effectiveness in utilizing potential. Tends to be lazy and quantity and quality of output is almost always far less than capabilities.	( )
		( )
3-		
4—	Motivation is borderline in directing activities to utilize full artistic talents. Resulting performance and/or productivity usually tends to be less than potential.	( )
		( )
5-		
6—	Varied effectiveness in striving to utilize full capabilities. Times in which talent is realized are counteracted by later deficiencies in motivation to produce up to potential.	( )
		( )
7-		
8—	Satisfactorily effective in seeing that productive work gets accomplished within limits of artistic talent. Dedication tow utilizing potential usually meets desired standard	( )
		( )
9-		
10—	Above average motivation has had a noticeably positive effect on quantity and quality of work. Often attempts to utilize potential and excel to the best of his/her ability.	( )
		( )
11-		
12—	Dedicated and committed to make full utilization of artistic talent by striving to produce or perform at close to peak levels of potential.	( )
		( )
13-		
14—	Exceptional motivation as the student constantly strives to achieve a high level of artistic talent and to maximize his/her potential in this area.	( )
		( )
15-		
		( )

(WHEN YOU HAVE RATED EACH STUDENT, TURN THE PAGE.)

Art Checklist

1. Evaluate each student's ability to project beauty, pleasing relationships, successful composition, i.e., an aesthetic quality in his/her artistic products.

   A. Maintains a high degree of aesthetic quality.
   B. Aesthetic quality is more pronounced in some products than others.
   C. Artistic products are often somewhat deficient in aesthetic quality.

2. Describe each student's sense and understanding of self.

   A. Exceptional understanding of self.
   B. Above average understanding of self.
   C. Average understanding of self.
   D. Below average understanding of self.

3. Which one of the following alternatives best describes each student?

   A. Usually begins a project with a clear image of what is to be done and follows it through to completion.
   B. Usually begins a project with a general idea and changes avenues many times before final completion.
   C. Begins a project with an idea, but drops the project before completion.

4. Evaluate each student on the basis of creative imagination.

   A. Usually projects uncommon forms, symbols, color relationships, interpretation, etc.
   B. Often projects uncommon forms, symbols, color relationships, interpretation, etc.
   C. Only occasionally projects uncommon forms, symbols, color relationships, interpretation, etc.
   D. Only projects common forms, symbols, color relationships, lacks interpretation.

5. Indicate the extent to which each student becomes involved in his/her artistic work.

   A. Is always persistent and highly involved.
   B. Is usually persistent and highly involved.
   C. Is more involved with certain projects than others.
   D. Is usually rather complacent and lacks persistence and involvement.

6. Evaluate each student's ability to adapt to and produce works of artistic merit across different types of media.

   A. Is capable of producing meritable works in a number of different media.
   B. Is capable of producing meritable works in a few different media.
   C. Basically concentrates in one medium.

Checklist Answers for Art

On the page to your left, six items are listed describing various components of performance in art. Consider each item and the alternatives carefully for each student you are rating. For each question select the alternative which best describes each student's performance and record the alphabetical letter corresponding to the alternative in the appropriate space beside his/her name. Make the best single choice you can even though no one of the statements within a set fits the student exactly. Rate all your students on one item before continuing on to the next item.

1.	2.	3.	4.	5.	6.
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )

EXPRESSION OF SELF

Consider each student's expression of self in your area of artistic endeavor. Evaluate the student on the degree to which he/she projects a distinctive personal style which reflects a free and independent interpretation and production of artistic subject matter. Emphasize ONLY the ability to project a distinctive personal style.

Hypothetical breakdown of how a sample of 100 students might be distributed across the descriptive statements.

5%	10%	20%	30%	20%	10%	5%

1-
Has demonstrated very little personal style. Work projects a conservative and static approach to interpretation and production of artistic subject matter. ( )
2— ( )
3- ( )
Somewhat hesitant about displaying a distinctive personal style. Work is rather deliberate and conforming and usually lacks an independent interpretation or effort. ( )
4— ( )
5- ( )
Has a limited interest and enthusiasm for the development of a personal style. Work is usually of a conservative and practical nature. ( )
6— ( )
7- ( )
Has a moderate or average amount of personal style. Demonstrates some free and independent interpretation and production of artistic subject matter. ( )
8— ( )
9- ( )
Often attempts to display a personal style. Work demonstrates a distinctive and independent approach to interpretation and production. ( )
10— ( )
11- ( )
Usually attempts to project a distinctive idea and personal style. Exercises a high degree of independent effort and interpretation in the achievement of artistic goals. ( )
12— ( )
13- ( )
Exceptional facility to project a distinctive idea and personal style. Possesses an outstanding capability for self-direction and freedom in artistic interpretation and production. ( )
14— ( )
15- ( )

(WHEN YOU HAVE RATED EACH STUDENT, TURN THE PAGE.)

Dance Checklist

1. Evaluate each student's ability to adapt to the rhythm, tempo, speed, etc., of the music while dancing.

   A. Usually displays an excellent ability to adapt to music.
   B. Often displays a quite satisfactory ability to adapt to music.
   C. Adequate ability to adapt to music.
   D. Somewhat unsatisfactory ability to adapt to music.

2. Describe each student's ability to explore and move in space, i.e., awareness of space.

   A. Excellent awareness of space.
   B. Above average awareness of space.
   C. Average awareness of space.
   D. Somewhat below average awareness of space.

3. Describe each student's ability to convey an idea through movement.

   A. Possesses an exceptional ability to convey an idea through movement.
   B. Is definitely above average in ability to convey an idea through movement.
   C. Has about an average ability to convey an idea through movement.
   D. Is somewhat below average in ability to convey an idea through movement.

4. Evaluate each student in terms of the body structure which should be projected by a professional.

   A. Body structure as a dancer is very satisfactory.
   B. Body structure as a dancer is acceptable.
   C. Body structure as a dancer does not fit the norm.

5. Describe each student in terms of a demonstrated desire to explore movement and an antitude to compose and/or arrange in dance.

   A. Excellent composition and arrangement abilities.
   B. Has demonstrated a high degree of desire and promise in this area.
   C. Some compositions and arrangements have been at least adequate.
   D. Has not demonstrated a high degree of desire or promise in this area.

6. Indicate the extent to which each student is able to maintain a satisfactory measure of self-discipline and awareness of line, and avoid making mistakes during class (and performance).

   A. Exerts a highly satisfactory measure of self discipline and awareness of line, almost never makes mistakes.
   B. Demonstrates an adequate or satisfactory measure of self-discipline and awareness of line.
   C. Mistakes are usually rare.
   D. Occasionally makes mistakes during class (and in performance).

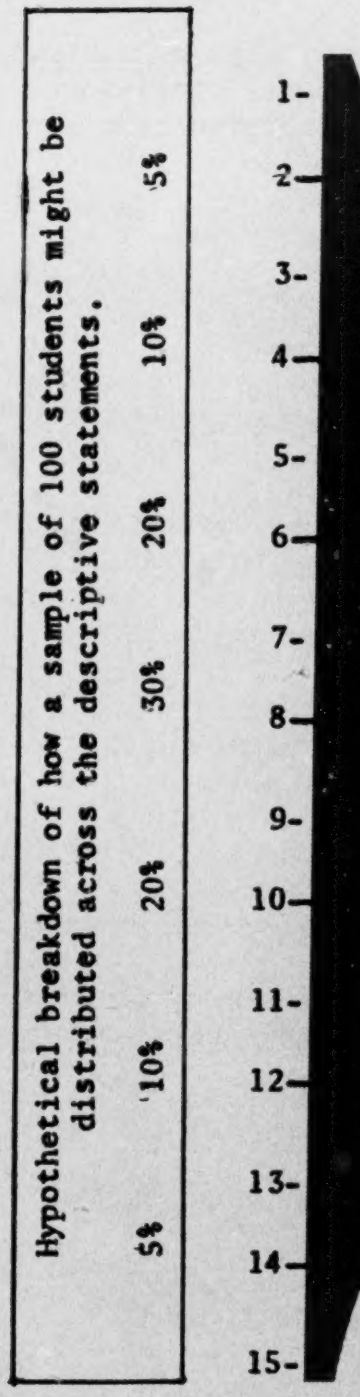
Checklist Answers for Dance

On the page to your left, six items are listed describing various components of performance in dance. Consider each item and the alternatives carefully for each student you are rating. For each question select the alternative which best describes each student's performance and record the alphabetical letter corresponding to the alternative in the appropriate space beside his/her name. Make the best single choice you can even though no one of the statements within a set fits the student exactly. Rate all your students on one item before continuing on to the next item.

1.	2.	3.	4.	5.	6.
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )

POTENTIAL

Consider each student's degree of potential in your area of artistic endeavor. Using your judgment, evaluate the probability of his/her becoming a highly recognized and prominent figure in your artistic area in the future, just on the basis of artistic ability as evidenced by present achievement.



1-

2- s not likely to pursue an artistic career, or if one were rsued, would most likely receive only minimal recognition. ( )

( )

3- ( )

4- lly could achieve some competence and proficiency, but n of work would be limited. ( )

5- ( )

6- ue an artistic career to the extent that ognition would be received. ( )

( )

7- ( )

8- -known regionally or locally, but ( )

( )

9- ( )

10- e a little national recognition and ominent figure. ( )

( )

11- ( )

12- y could receive national recognition and become nent figure. ( )

( )

13- ( )

14- otentially could receive widespread national or international recognition and become a very prominent figure. ( )

( )

15- ( )

(WHEN YOU HAVE RATED EACH STUDENT, TURN THE PAGE.)

Theater Checklist

1. Describe each student's theatrical talent.

   A. Possesses little or no talent, belongs someplace other than theater.
   B. Possesses some or possibly a great deal of talent and potentially might be successful in theater.
   C. Highly talented, belongs in no place other than theater.

2. Evaluate each student's ability to perform different roles.

   A. Can perform almost any role.
   B. Can perform many different roles.
   C. Can perform some different roles, but not others.
   D. Is rather stereotyped in the type of roles which he/she can perform.

3. Evaluate each student's ability to improvise.

   A. Excellent ability to improvise.
   B. Good improvisation abilities.
   C. Usually has some trouble when attempting to improvise.

4. Indicate the degree to which each student attempts to concentrate and make each of his/her parts believable within the framework of a particular play or style.

   A. Always attempts to make a part as believable as possible.
   B. Usually attempts to make a part as believable as possible.
   C. Only sometimes provides the concentration to make a part as believable as possible.

5. Describe each student's ability to empathize with other actors and/or the audience.

   A. Empathizes very effectively.
   B. Empathizes satisfactorily.
   C. Ability to empathize is somewhat inadequate.

6. Describe each student's sense of understanding of self.

   A. Exceptional understanding of self.
   B. Above average understanding of self.
   C. Average understanding of self.
   D. Below average understanding of self.

Checklist Answers for Theater

On the page to your left, six items are listed describing various components of performance in theater. Consider each item and the alternatives carefully for each student you are rating. For each question select the alternative which best describes each student's performance and record the alphabetical letter corresponding to the alternative in the appropriate space beside his/her name. Make the best single choice you can even though no one of the statements within a set fits the student exactly. Rate all your students on one item before continuing on to the next item.

1.	2.	3.	4.	5.	6.
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )
( )	( )	( )	( )	( )	( )

Overall Checklist Evaluation

1. Which of the following best describes each student?

   A. Sometimes uncooperative or obstinate.
   B. Behavior is generally satisfactory.
   C. Has a very congenial relationship with instructors

2. Describe each student's ability to ask thought provoking questions.

   A. Very effective, questions reflect keen insight.
   B. About average in bringing up questions that are meaningful.
   C. Rarely asks thought provoking questions.
   D. Does not ask questions.

3. Which of the following best describes each student?

   A. Seems to have about average confidence in abilities.
   B. Has tackled difficult problems others have avoided.
   C. Does not see himself/herself as able to solve many new problems.

4. Describe each student's initiative and leadership abilities in comparison to other students.

   A. Frequently initiates and leads new activities which are accepted by other students.
   B. Somewhat above average in initiating and leading new activities.
   C. About average in initiating and leading new activities.
   D. Rarely takes the lead in group activities.
   E. Practically never initiates or leads new activities - a non-participant or follower.

5. Describe each student's willingness to become involved in the work of others.

   A. High involvement and interest in the work of others.
   B. Becomes moderately involved in the work of others.
   C. Limited desire to become involved in the work of others.

6. Which of the following best describes each student?

   A. Occasionally seeks new ways of doing assigned tasks.
   B. Would have trouble thinking up new ideas.
   C. Usually has a variety of ideas to suggest.

Checklist Answers for Overall Performance

On the page to your left, six items are listed describing various components of overall performance. Consider each item and the alternatives carefully for each student you are rating. For each question select the alternative which best describes each student's performance and record the alphabetical letter corresponding to the alternative in the appropriate space beside his/her name. Make the best single choice you can even though no one of the statements within a set fits the student exactly. Rate all your students on one item before continuing on to the next item.

1.	2.	3.	4.	5.
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )
( )	( )	( )	( )	( )

list Answers for Overall Performance
x items are listed describing various components of overall
item and the alternatives carefully for each student you are
elect the alternative which best describes each student's per-
abetical letter corresponding to the alternative in the appro-
name. Make the best single choice you can even though no one
et fits the student exactly. Rate all your students on one
the next item.

Write the number from the scale which best describes each student in the parentheses beside his name.

3.	4.	5.	6.	Students to be Rated
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____
( )	( )	( )	( )	_____